# LIST OF EFFECTIVE PAGES

## Chapter 55
## STABILIZERS

| CHAPTER | PAGE | DATE | CODE |
|---|---|---|---|
| * 55 | i | Feb. 20/62 | AB-2 |
| * 55 | ii | Feb. 20/62 | AB-1 |
| * 55 | 1 | Feb. 20/62 | AB-2 |
| * 55 | 2 | Feb. 20/62 | AB-2 |
| * 55 | 3 | Feb. 20/62 | AB-1 |
| | BLANK | | |
| * 55-0 | 1 | Feb. 20/62 | AB-2 |
| * 55-0 | 2 | Feb. 20/62 | AB-2 |
| 55-0 | 201 | Aug. 30/61 | AB-1 |
| * 55-0 | 202 | Feb. 20/62 | AB-2 |
| 55-0 | 203 | Aug. 30/61 | AB-1 |
| * 55-0 | 204 | Feb. 20/62 | AB-2 |
| * 55-0 | 205 | Feb. 20/62 | AB-2 |
| | BLANK | | |
| * 55-1-0 | 1 | Feb. 20/62 | AB-2 |
| * 55-1-0 | 2 | Feb. 20/62 | AB-2 |
| * 55-1-0 | 401 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 402 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 403 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 404 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 405 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 406 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 407 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 408 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 409 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 410 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 411 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 412 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 413 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 414 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 415 | Feb. 20/62 | AB-1 |
| | BLANK | | |
| * 55-1-0 | 601 | Feb. 20/62 | AB-1 |
| * 55-1-0 | 602 | Feb. 20/62 | AB-1 |
| 55-1-1 | 1 | Aug. 30/61 | AB-1 |
| | BLANK | | |
| 55-1-2 | 1 | Aug. 30/61 | AB-1 |
| | BLANK | | |
| 55-1-3 | 1 | Aug. 30/61 | AB-1 |
| | BLANK | | |
| 55-1-3 | 201 | Aug. 30/61 | AB-1 |
| 55-1-3 | 202 | Aug. 30/61 | AB-1 |
| 55-1-3 | 203 | Aug. 30/61 | AB-1 |
| 55-1-3 | 204 | Aug. 30/61 | AB-1 |
| * 55-1-4 | 1 | Feb. 20/62 | AB-2 |
| | BLANK | | |
| 55-1-5 | 1 | Aug. 30/61 | AB-1 |
| | BLANK | | |
| 55-1-5 | 201 | Aug. 30/61 | AB-1 |
| 55-1-5 | 202 | Aug. 30/61 | AB-1 |
| * 55-1-6 | 1 | Feb. 20/62 | AB-2 |
| * 55-1-6 | 2 | Feb. 20/62 | AB-2 |
| * 55-1-6 | 3 | Feb. 20/62 | AB-2 |
| | BLANK | | |
| * 55-1-7 | 1 | Feb. 20/62 | AB-2 |
| | BLANK | | |
| 55-1-7 | 201 | Aug. 30/61 | AB-1 |
| * 55-1-7 | 202 | Feb. 20/62 | AB-2 |
| 55-1-7 | 203 | Aug. 30/61 | AB-1 |
| | BLANK | | |
| * 55-1-8 | 1 | Feb. 20/62 | AB-1 |
| | BLANK | | |
| * 55-1-8 | 401 | Feb. 20/62 | AB-1 |
| * 55-1-8 | 402 | Feb. 20/62 | AB-1 |
| * 55-1-8 | 403 | Feb. 20/62 | AB-1 |
| * 55-1-8 | 404 | Feb. 20/62 | AB-1 |
| * 55-1-8 | 405 | Feb. 20/62 | AB-1 |
| * 55-1-8 | 406 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 1 | Feb. 20/62 | AB-2 |
| * 55-2-0 | 2 | Feb. 20/62 | AB-2 |
| * 55-2-0 | 401 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 402 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 403 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 404 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 405 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 406 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 407 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 408 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 409 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 410 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 411 | Feb. 20/62 | AB-1 |
| | BLANK | | |
| * 55-2-0 | 413 | Feb. 20/62 | AB-1 |
| * 55-2-0 | 414 | Feb. 20/62 | AB-1 |

* Pages revised, added or deleted by this revision.

LIST OF EFFECTIVE PAGES (CONT)

| | CHAPTER | PAGE | DATE | CODE |
|---|---|---|---|---|
| * | 55-2-0 | 415 | Feb. 20/62 | AB-1 |
| | | BLANK | | |
| * | 55-2-0 | 601 | Feb. 20/62 | AB-1 |
| | | BLANK | | |
| * | 55-2-1 | 1 | Feb. 20/62 | AB-2 |
| | 55-2-1 | 2 | Aug. 30/61 | AB-1 |
| | 55-2-2 | 1 | Aug. 30/61 | AB-1 |
| | | BLANK | | |
| * | 55-2-2 | 201 | Feb. 20/62 | AB-2 |
| | 55-2-2 | 202 | Aug. 30/61 | AB-1 |
| * | 55-2-2 | 203 | Feb. 20/62 | AB-2 |
| * | 55-2-2 | 204 | Feb. 20/62 | AB-2 |
| | 55-2-3 | 1 | Aug. 30/61 | AB-1 |
| | | BLANK | | |
| * | 55-2-4 | 1 | Feb. 20/62 | AB-2 |
| | | BLANK | | |
| * | 55-2-4 | 201 | Feb. 20/62 | AB-2 |
| * | 55-2-4 | 202 | Feb. 20/62 | AB-2 |
| * | 55-2-4 | 203 | Feb. 20/62 | AB-2 |
| | | BLANK | | |
| * | 55-2-5 | 1 | Feb. 20/62 | AB-2 |
| * | 55-2-5 | 2 | Feb. 20/62 | AB-2 |

* Pages revised, added or deleted by this revision.

Chapter 55
STABILIZERS

TABLE OF CONTENTS


| CHAPTER SECTION | SUBJECT | PAGE |
|---|---|---|
| 55-0 | STABILIZERS | |
| | General | 1 |
| | Cleaning/Painting - Stabilizers | 201 |
| | Approved Repair - Leading Edge Dent | 201 |
| | Approved Repair - Leading Edge Crack | 204 |
| 55-1-0 | HORIZONTAL STABILIZER | |
| | General | 1 |
| | Removal/Installation - Horizontal Stabilizer | 401 |
| | Removal/Installation - Horizontal Stabilizer Pivot Bearing Assembly | 410 |
| | Removal/Installation - Horizontal Stabilizer Pivot Bearing Spindle | 412 |
| | Inspection/Check Horizontal Stabilizer | 601 |
| 55-1-1 | HORIZONTAL STABILIZER INTERSPAR ASSEMBLY | |
| | Description | 1 |
| | Structure | 1 |
| 55-1-2 | HORIZONTAL STABILIZER TORQUE BOX ASSEMBLY AND REAR SPAR CENTER TIE | |
| | Description | 1 |
| | Structure | 1 |
| 55-1-3 | HORIZONTAL STABILIZER LEADING EDGE | |
| | Description | 1 |
| | Structure | 1 |
| | Removal/Installation - Horizontal Stabilizer Leading Edge | 201 |
| 55-1-4 | HORIZONTAL STABILIZER TRAILING EDGE | |
| | Description | 1 |
| | Structure | 1 |
| 55-1-5 | HORIZONTAL STABILIZER TIPS | |
| | Description | 1 |
| | Removal/Installation - Horizontal Stabilizer Tip | 201 |

TABLE OF CONTENTS (CONT)


| CHAPTER SECTION | SUBJECT | PAGE |
|---|---|---|
| 55-1-6 | ELEVATORS | |
| | Description | 1 |
| | Structure | 1 |
| 55-1-7 | HORIZONTAL STABILIZER VORTEX GENERATORS | |
| | Description | 1 |
| | Structure | 1 |
| | Removal/Installation - Horizontal Stabilizer Vortex Generators | 201 |
| 55-1-8 | HORIZONTAL STABILIZER SEALS | |
| | General | 1 |
| | Removal/Installation - Horizontal Stabilizer Seals at Fuselage Station 1568.00 | 401 |
| | Removal/Installation - Horizontal Stabilizer Upper and Lower Sealing Blades at Fuselage Stations 1618.00 and 1653.00 | 404 |
| | Removal/Installation - Horizontal Stabilizer to Fuselage Upper and Lower Surface Seals | 404 |
| | Removal/Installation - Horizontal Stabilizer Inboard Leading Edge Stub Seal | 405 |
| 55-2-0 | VERTICAL STABILIZER | |
| | General | 1 |
| | Removal/Installation Vertical Stabilizer | 401 |
| | Inspection/Check Vertical Stabilizer | 601 |
| 55-2-1 | VERTICAL STABILIZER INTERSPAR ASSEMBLY | |
| | Description | 1 |
| | Structure | 1 |
| 55-2-2 | VERTICAL STABILIZER LEADING EDGE | |
| | Description | 1 |
| | Structure | 1 |
| | Removal/Installation Vertical Stabilizer Leading Edge | 201 |
| 55-2-3 | VERTICAL STABILIZER TRAILING EDGE | |
| | Description | 1 |
| | Structure | 1 |

TABLE OF CONTENTS (CONT)


| CHAPTER SECTION | SUBJECT | PAGE |
|---|---|---|
| 55-2-4 | VERTICAL STABILIZER TIP | |
| | Description | 1 |
| | Removal/Installation Vertical Stabilizer Tip | 201 |
| 55-2-5 | RUDDER | |
| | Description | 1 |
| | Structure | 1 |

Chapter 55

# STABILIZERS - DESCRIPTION AND OPERATION

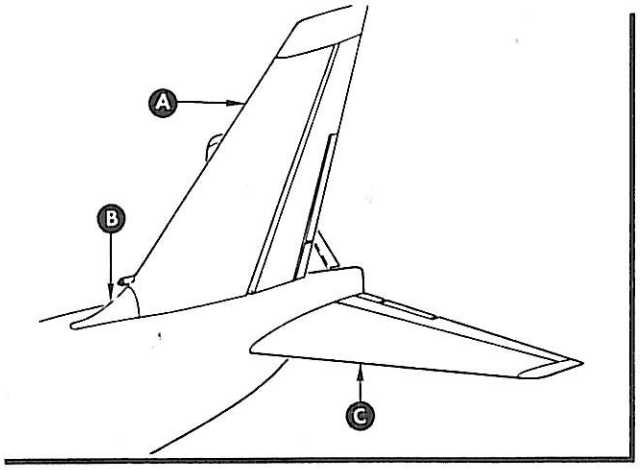
## 1. General

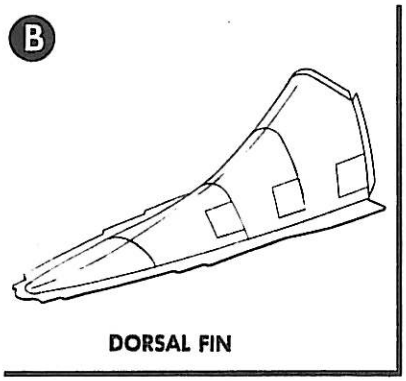
The horizontal and vertical stabilizers (see Figure 1) are of full cantilever spar-box construction, using built-up spars, ribs, and plate-stringer skin panels. The horizontal and vertical stabilizers have a 35-degree sweepback at the 30-percent chord line. Leading edges of the horizontal and vertical stabilizers are electrically de-iced by integral de-icing pads bonded to all except the stub leading edge sections.

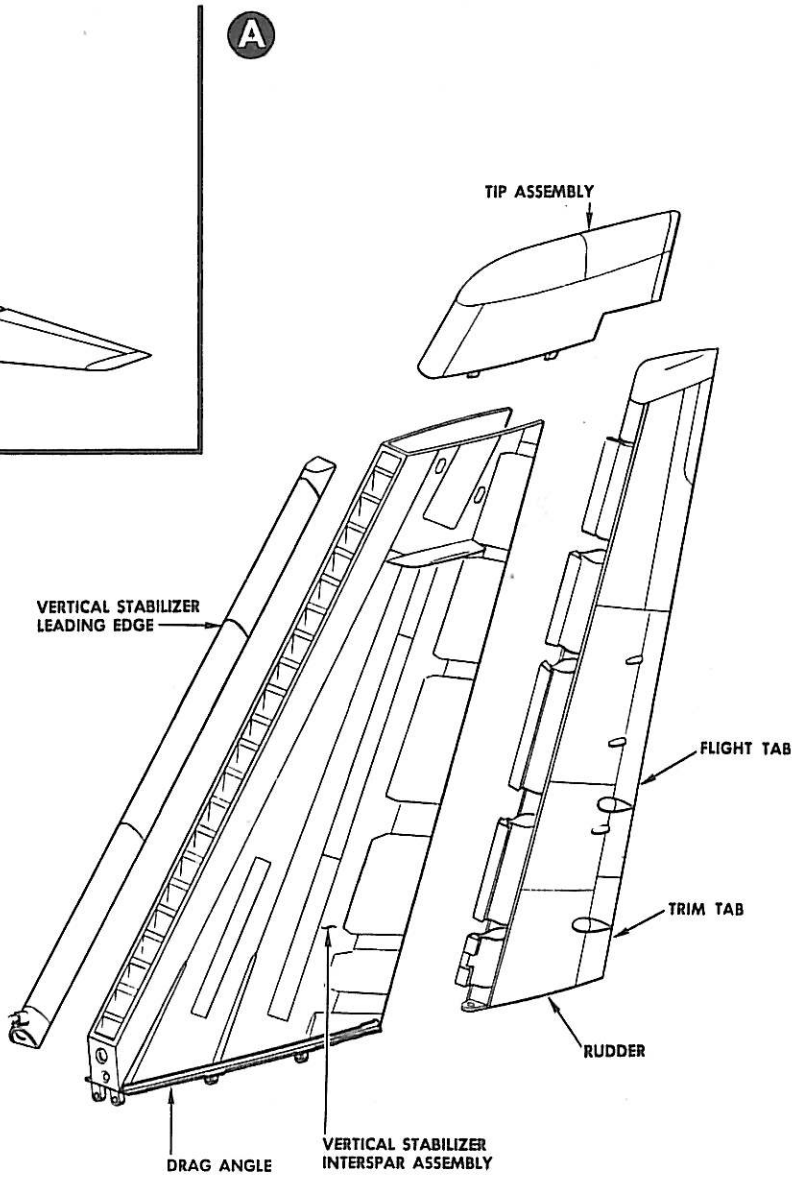
The horizontal stabilizer sections are moved as a unit by a torque box assembly to accomplish airplane longitudinal trim. Each horizontal stabilizer section is secured to the torque box assembly at the front and center spar fittings. The two rear spar fittings are interconnected by a rear spar center tie. The stabilizer sections pivot on spindles, one on each side of the fuselage, and rotate on pivot bearings. The pivot bearings are mounted in the stabilizer ribs forward of the rear spar, and adjacent to the fuselage. The trailing edge of each horizontal stabilizer incorporates an elevator; each elevator trailing edge includes a flight tab and auxiliary tab.

A fuselage mounted, hydraulically-operated screwjack actuator mounts on the front side of the torque box assembly. Trim range of the horizontal stabilizer is from 2.5 degrees leading edge up to 15.5 degrees leading edge down. Pressure boards hinge to the leading edges of the elevator assemblies to reduce pilot input required to operate the control systems.

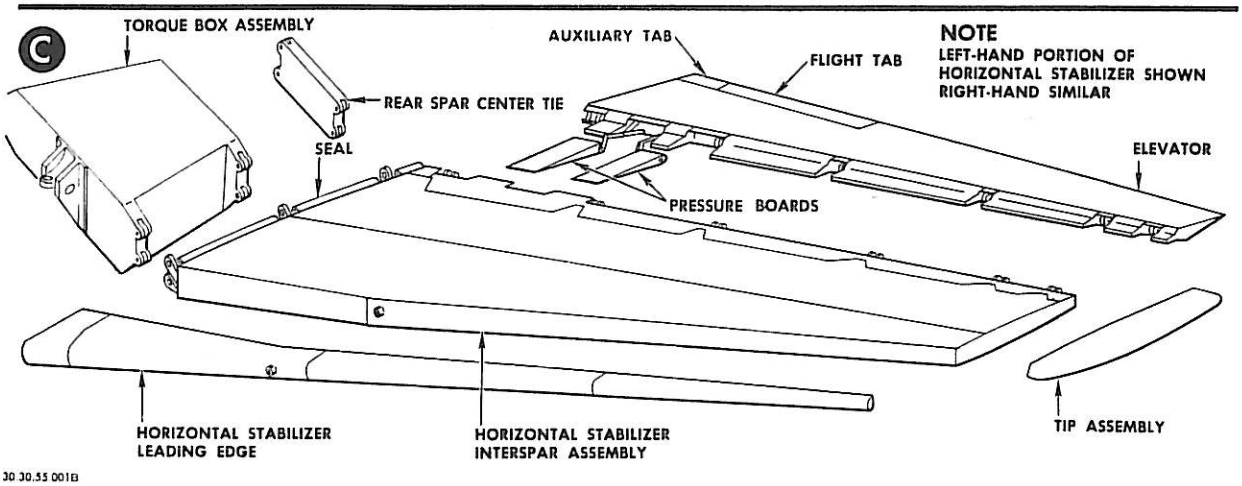
The vertical stabilizer extends approximately 20 feet above the fuselage, and is secured to the fuselage structure at six points, three on each side of the airplane center line. The six points of attachment are located at the front, center, and rear spars of the stabilizer. In addition to the six main attaching points, drag angles are fastened to each side of the stabilizer-to-fuselage area. The drag angles transfer vertical stabilizer skin loads into the fuselage skin. The trailing edge of the vertical stabilizer incorporates a rudder; the rudder trailing edge includes a flight tab and trim tab.




VERTICAL STABILIZER




30 30.55 001B

## STABILIZERS - MAINTENANCE PRACTICES

1. Cleaning/Painting

   A. Keep all structure free from contaminants or materials that could damage metals. Clean all substances in accordance with instructions in Chapter 51, STRUCTURES - GENERAL.

   B. Paint all surfaces requiring touch up or major finish repairs in accordance with procedures in Chapter 51, STRUCTURES - GENERAL.

2. Approved Repair - Leading Edge Dent (see Figure 201)

   A. General.

      Minor dents in the horizontal and vertical stabilizer leading edges may be repaired, if the de-icing heater pads and sensors pass a continuity check and a dielectric test after the rework. Should the leading edge not pass both the continuity check and the dielectric test, it is recommended that the leading edge section be returned to the vendor for repair.

   B. Equipment Required.

      (1) Dye penetrant, Specification MIL-I-25135.

      (2) Ohmeter.

      (3) Hypot tester, Associated Research, Inc., Chicago, Ill., or equivalent.

      (4) Source of 115-volt, 60 cps, ac power to operate the Hypot tester.

   C. Procedure.

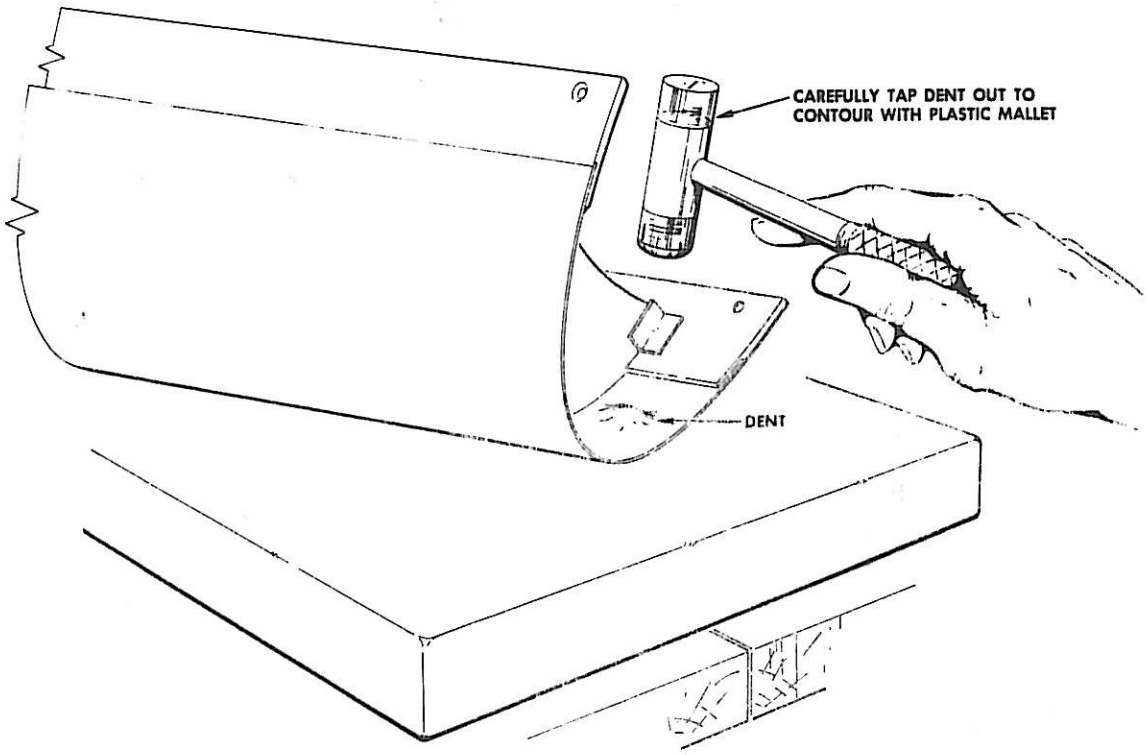
      (1) Remove damaged leading edge section. Refer to applicable leading edge Removal/Installation procedure (55-1-3 for horizontal stabilizer or 55-2-2 for vertical stabilizer).

      (2) Using a plastic mallet, carefully tap dent out to contour.

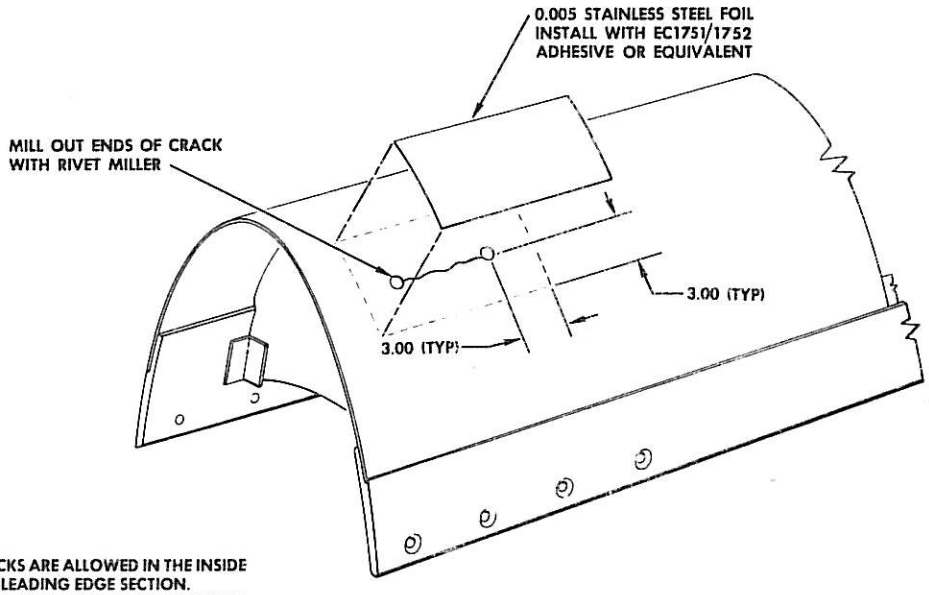
      (3) With dye penetrant, Specification MIL-I-25135, dye check inner and outer leading edge skins in area of dent for cracks. If inside skin is cracked, it is recommended that the leading edge section be returned to vendor for repair. If outer skin is cracked, accomplish repair (refer to Approved Repair - Leading Edge Crack).

      (4) Accomplish a continuity check as follows:

         (a) Disconnect heater pad relays. (Refer to Wiring Diagram Manual, Chapter 30, ICE AND RAIN PROTECTION).




**LEADING EDGE DENT REPAIR**




**NOTE:**

1. NO CRACKS ARE ALLOWED IN THE INSIDE SKIN OF LEADING EDGE SECTION.
2. LEADING EDGE MUST PASS DIELECTRIC AND CONTINUITY CHECKS AFTER REPAIR.

**LEADING EDGE CRACK REPAIR**

22 02 55 015 B

(b) With an ohmeter, check continuity through each heater pin socket at relay receptacle to ground. If faulty, isolate trouble. If trouble is found in heater pads, it is recommended that the leading edge section be returned to vendor for repair.

(c) Leave heater pad relays disconnected for making dielectric test.

(5) Accomplish dielectric test as follows:

(a) Disconnect all grounds from the leading edge section. Refer to Wiring Diagram Manual, Chapter 30, ICE AND RAIN PROTECTION.

(b) Using an ohmeter, make certain that all grounds are broken.

CAUTION: IF ANY GROUND REMAINS CONNECTED DURING DIELECTRIC TEST, HEATER PADS AND SENSORS CAN BE PERMANENTLY DAMAGED.

(c) Connect Hypot tester, or equivalent, between sensor pin sockets at relay receptacle and leading edge outer skin.

(d) Starting at zero volts, apply a test voltage at a rate not to exceed 250 volts rms per second and increase to 500 volts rms. Hold for one minute, then decrease test voltage to zero at same rate. Sensor must withstand test voltage without damage or breakdown. With voltage at zero, disconnect tester.

WARNING: DO NOT ATTEMPT TO DISCONNECT TESTER WITH VOLTAGE STILL APPLIED TO SENSOR. SERIOUS PERSONAL INJURY MAY RESULT FROM CONTACT.

(e) Connect Hypot tester, or equivalent, between sensor pin sockets at relay receptacle and leading edge inner skin.

(f) Repeat step (d).

(g) Connect Hypot tester, or equivalent, between each sensor and repeat step (d).

(h) Connect Hypot tester, or equivalent, between heater pin sockets at relay receptacle and leading edge outer skin.

(i) Starting at zero volts, apply a test voltage at a rate not to exceed 250 volts rms per second and increase to 1000 volts rms. Hold for one minute, then decrease test voltage to zero at same rate. Heater pad must withstand test voltage without damage or breakdown. With voltage at zero, disconnect tester.

WARNING: DO NOT ATTEMPT TO DISCONNECT TESTER WITH VOLTAGE STILL APPLIED TO HEATER PAD. SERIOUS PERSONAL INJURY MAY RESULT FROM CONTACT.

(j) Connect Hypot tester, or equivalent, between heater pin sockets at relay receptacle and leading edge inner skin.

(k) Repeat step (i).

(l) Connect Hypot tester, or equivalent, between each heater pad and repeat step (i).

(6) Reconnect relays and ground connections. Refer to Wiring Diagram Manual, Chapter 30, ICE AND RAIN PROTECTION.

(7) Reinstall leading edge section. Refer to applicable leading edge Removal/Installation procedure (55-1-3 for horizontal stabilizer or 55-2-2 for vertical stabilizer).

3. Approved Repair - Leading Edge Crack (see Figure 201)

A. General.

Minor cracks in the stainless steel outer skins of the horizontal and vertical stabilizer leading edges may be repaired, if the de-icing heater pads and sensors pass a continuity check and a dielectric test after the rework. Should the leading edge not pass the continuity check and dielectric test, it is recommended that the leading edge section be returned to the vendor for repair.

B. Equipment Required.

(1) Dye penetrant, Specification MIL-I-25135.

(2) Rivet miller to mill out ends of crack.

(3) Adhesive EC 1751/1752, 3M Company, St. Paul 6, Minn., or equivalent.

NOTE: Narmco 3119 adhesive, Narmco, Inc., San Diego, Cal., may be used as an alternate adhesive.

(4) Ohmeter.

(5) Hypot tester, Associated Research, Inc., Chicago, Ill., or equivalent.

(6) Source of 115-volt, 60 cps, ac power to operate the Hypot tester.

C. Procedure.

(1) Remove damaged leading edge section. Refer to applicable leading edge Removal/Installation procedure (55-1-3 for horizontal stabilizer or 55-2-2 for vertical stabilizer).

(2) Apply dye penetrant, Specification MIL-I-25135, to cracked area of leading edge skin to locate ends of crack.

(3) Using a rivet miller, carefully mill out ends of crack. Do not use a drill.

CAUTION: STAINLESS STEEL OUTER SKIN IS ONLY 0.005-INCH THICK. DO NOT MILL BEYOND OUTER SKIN. IF MILLING OPERATION PENETRATES DE-ICING HEATER PADS, THEY CAN BE PERMANENTLY DAMAGED. IT IS RECOMMENDED RIVET MILLER BE ADJUSTED TO PROPER DEPTH ON A PIECE OF SCRAP 0.005-INCH STAINLESS STEEL FOIL.

(4) Fabricate a repair patch from 0.005-inch stainless steel foil that is large enough to overlap area of crack by 3.00 inches in all directions.

(5) Apply a coat of EC 1751/1752 adhesive, 3M Company, St. Paul 6, Minn. or equivalent, to repair patch per manufacturer's instructions and install over crack. Allow adhesive to cure for length of time specified by manufacturer.

(6) Accomplish continuity check. Refer to Approved Repair - Leading Edge Dent, step C. (4).

(7) Accomplish dielectric test. Refer to Approved Repair - Leading Edge Dent, step C. (5).

(8) Reconnect relays and ground connections. Refer to Wiring Diagram Manual, Chapter 30, ICE AND RAIN PROTECTION.

(9) Reinstall leading edge section. Refer to applicable leading edge Removal/Installation procedure (55-1-3 for horizontal stabilizer or 55-2-2 for vertical stabilizer).

# HORIZONTAL STABILIZER - DESCRIPTION AND OPERATION

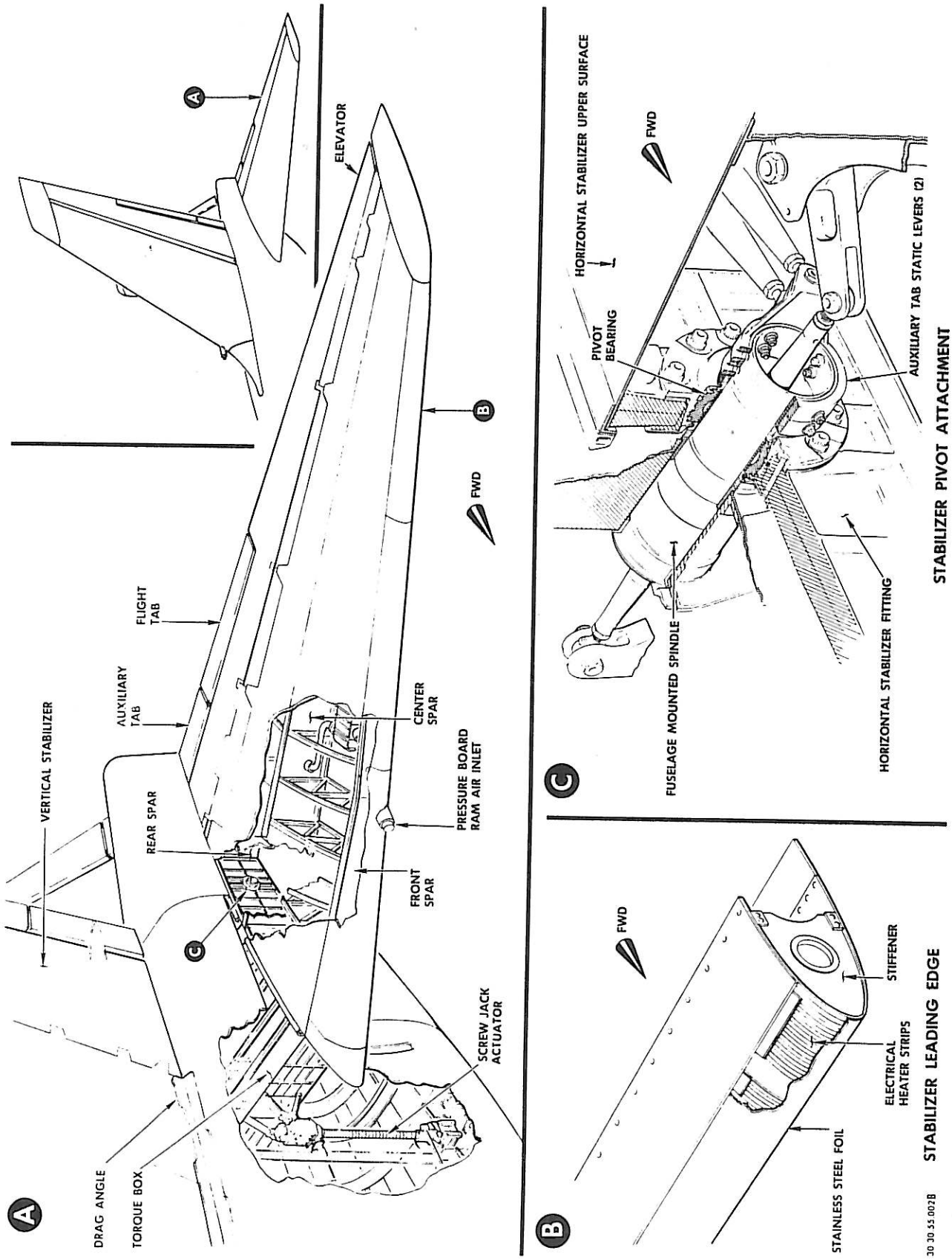
## 1. General

The horizontal stabilizer has a span of approximately 39 feet and a dihedral of 7.5 degrees. The main structure of the stabilizer consists of a torque box assembly interconnecting the left and right stabilizer interspar assemblies, a rear spar center tie, electrically de-iced leading edges, stabilizer tips, and the elevator assemblies.

The complete horizontal stabilizer pivots on two fuselage support fittings, one on each side at fuselage station 1640 (see Figure 1). Spindles, inserted through the support fittings and stabilizer pivot bearings, are secured so they can not rotate. The pivot bearings provide bearing surface between the horizontal stabilizer fitting and the spindle.

A screwjack actuator mounted on the front side of the torque box assembly provides trim adjustment for the horizontal stabilizer. An auxiliary tab, located on the inboard end of each elevator assembly, reduces operating loads on the screwjack actuator. Since the stabilizer is adjustable for longitudinal trim, no trim tabs are required on the elevator control surfaces.

Rubber seals, installed at the inboard ends of the horizontal stabilizer assemblies, provide aerodynamic sealing at the fuselage area.






Horizontal Stabilizer
Figure 1

## HORIZONTAL STABILIZER - REMOVAL/INSTALLATION

1. Removal/Installation - Horizontal Stabilizer (see Figure 401)

A. General.

Removal and installation procedures for the left and right horizontal stabilizer structure assemblies are identical. The horizontal stabilizer can be removed or installed without removing the elevator. For removal/installation of elevator, refer to Chapter 27, FLIGHT CONTROL.

B. Equipment Required.

(1) Large maintenance stand, or equivalent supporting structure, with floor level located approximately at airplane water line 69.0.

(2) Adjustable horizontal stabilizer positioning stand, 22 J 113, or equivalent; as shown in Figure 401.

(3) Load bar and hoisting beams, or an equivalent lifting unit, for handling the horizontal stabilizer structure.

(4) Torque box support fixture; as shown in Figure 402.

(5) Hoist sling assembly for handing elevator assembly.

(6) Hoist with 5-ton lifting capacity.

(7) Corrosion Preventive, Specification MIL-C-16173, Grade 3.

(8) Torque wrench calibrated in foot-pounds.

(9) Lockwire, MS20995N51.

C. Preparation.

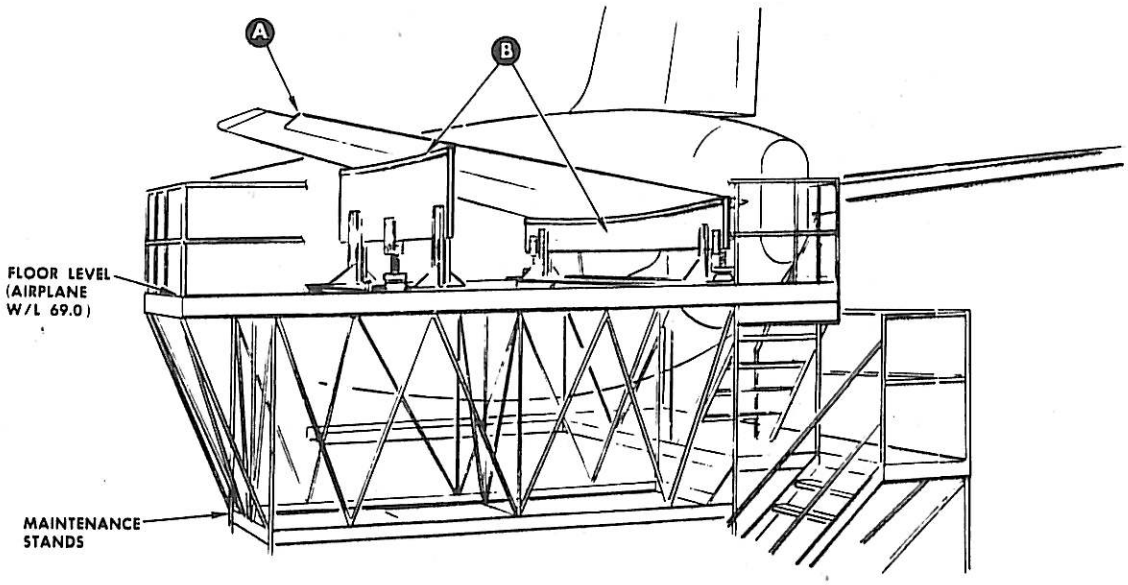
(1) Park and moor airplane in accordance with Chapter 10, PARKING AND MOORING.

(2) Open circuit breakers on main circuit breaker panel as listed below; refer to Chapter 24, ELECTRICAL POWER for locations. Hang a warning sign on panel.

(a) TAIL DE-ICE INPUT AND CONT.

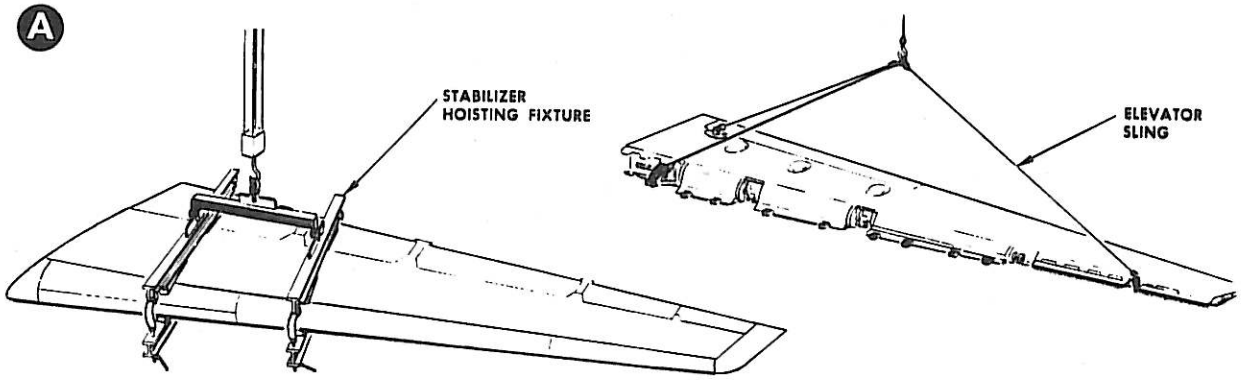
(b) BAL. BOARD INLET ANTI-ICE L/H and R/H.

(3) Position a large maintenance stand and an adjustable horizontal stabilizer positioning stand under stabilizer. Adjust three screwjacks on positioning stand to support weight of stabilizer as shown in Figure 401.

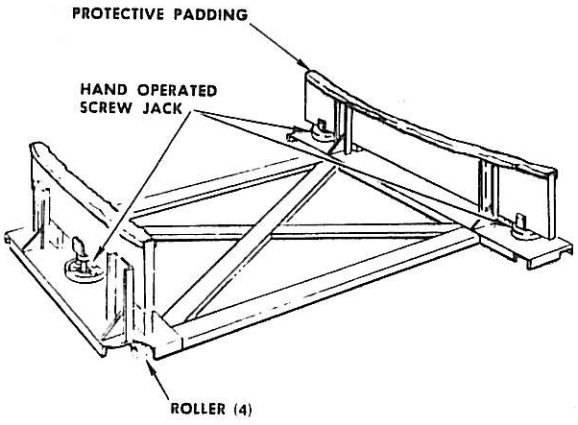



**HORIZONTAL STABILIZER POSITIONING STAND**

A



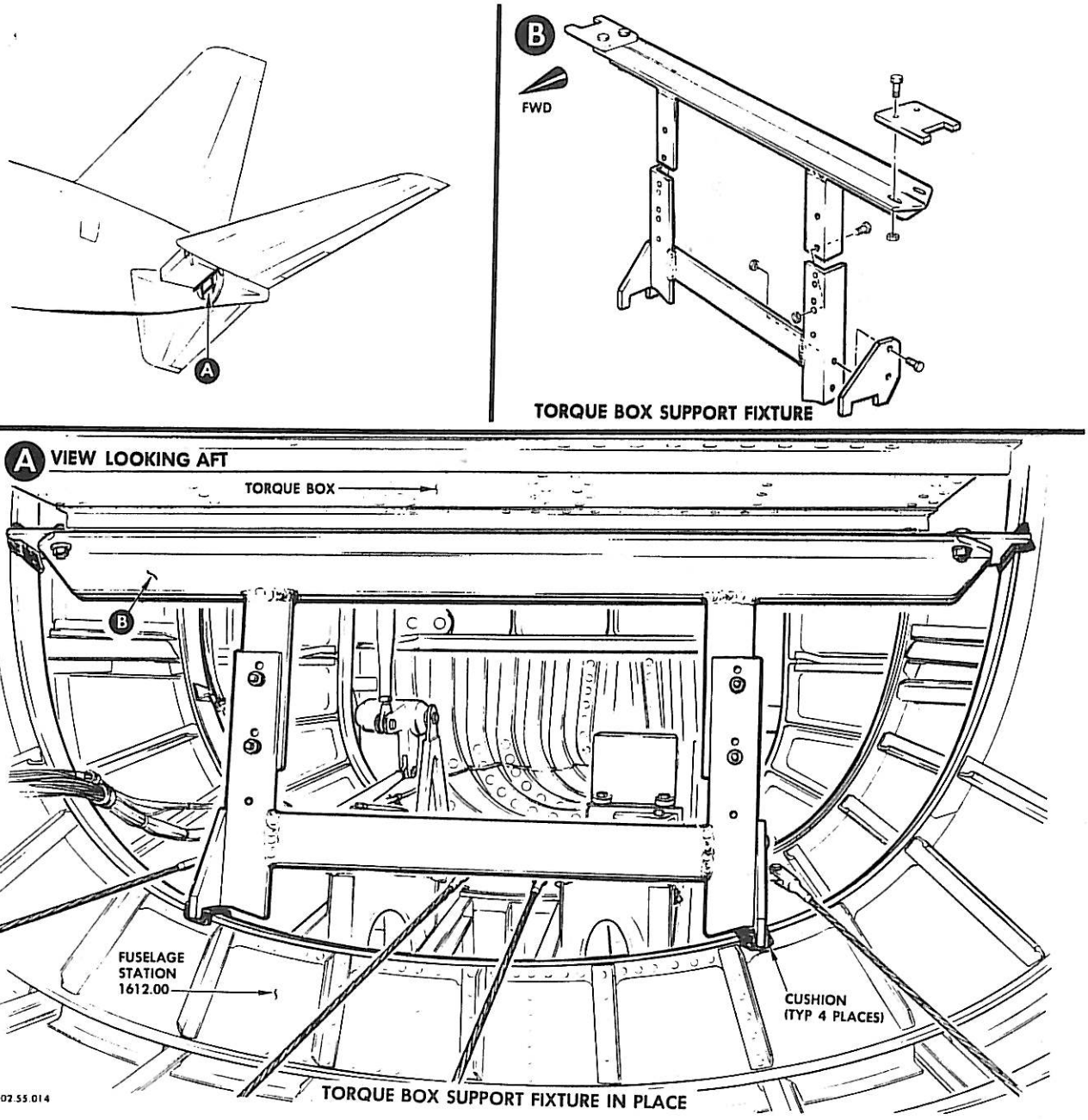

B




**NOTE:**

1. TO OBTAIN OPTIMUM ADJUSTMENT RANGE, THE SUPPORTING FLOOR MUST BE AT AIRPLANE WATER LINE 69.0.
2. A POSITIONING STAND IS REQUIRED UNDER HORIZONTAL STABILIZER BEFORE REMOVAL PROCEDURE IS STARTED.

30.02.55 013


A
B
FWD
TORQUE BOX SUPPORT FIXTURE
A VIEW LOOKING AFT
TORQUE BOX
B
FUSELAGE STATION 1612.00
CUSHION (TYP 4 PLACES)
30.02.55.014
TORQUE BOX SUPPORT FIXTURE IN PLACE

(4) Remove access doors and panels to gain access to stabilizer attachments; refer to Chapter 12, SERVICING.

(5) Remove stabilizer-to-fuselage seal below pivot bearing; refer to 55-1-8.

D. Remove Horizontal Stabilizer.

(1) Install index pins in bell cranks of elevator flight tab controls as directed in Chapter 27, FLIGHT CONTROL.

(2) Cut string ties from protective sleeving securing forward and aft sections of electrical harness at top forward center of horizontal stabilizer torque box.

(3) Attach identification tags and cut harness wires at permanent splice as directed in NOTES section of 990 Wiring Diagram Manual.

(4) Remove clamps attaching harness to stabilizer torque box.

(5) Remove ground wire from ground stud on seal retainer at fuselage seal cutout, fuselage station 1568.00.

(6) Pull harness from fuselage; coil and attach to stabilizer.

(7) Remove elevator flight tab control rod from center of stabilizer pivot spindle as directed in Chapter 27, FLIGHT CONTROL.

NOTE: Bag and tag all loose parts for ease of reinstallation.

(8) Remove elevator auxiliary tab control rods from inboard and outboard auxiliary tab static levers as directed in Chapter 27, FLIGHT CONTROL.

(9) Remove bolts securing auxiliary static levers to spindle as directed in Chapter 27, FLIGHT CONTROL.

(10) Remove auxiliary tab static levers from spindle as directed in Chapter 27, FLIGHT CONTROL.

(11) Remove stabilizer pivot spacer and shims from spindle.

(12) Remove upper and lower surface sealing baldes from fuselage cutouts at stabilizer attach points, fuselage stations 1618.00 and 1653.00; refer to 55-1-8.

(13) Remove seal at fuselage to stabilizer attach point cutout, fuselage station 1568.00; refer to 55-1-8.

(14) Remove seal retainer at seal cutout from stabilizer attach fitting at fuselage station 1568.00.

(15) Install torque box support fixture below rear spar of stabilizer torque box; as shown in Figure 402.

NOTE: Torque box support must be installed to prevent aft portion of torque box from dropping down and causing damage to stabilizer-to-fuselage attach point cutouts in fuselage skin.

(16) Remove stabilizer attach bolts at fuselage station 1653.00 (refer to Figure 403) as follows:

(a) Break lockwire on nut and bolt assembly; remove nuts, washers, and bolts from center tie bar and stabilizer spar attach fittings.

(b) If both left-hand and right-hand horizontal stabilizers are to be removed, remove nut and bolt assemblies on each end of center tie bar at stabilizer spar attach fittings.

(c) Provide cushion on inside fuselage structure, and lower center tie bar.

CAUTION: DO NOT NICK OR DAMAGE CENTER TIE BAR.

(17) Remove stabilizer attach bolts at fuselage station 1568.00 (refer to Figure 403) as follows:

(a) Remove nut, bolt, and washers from torque box attach fitting and stabilizer spar attach fitting.

(18) Remove stabilizer attach bolts at fuselage station 1618.00 (refer to Figure 403) as follows:

(a) Break lockwire on nut and bolt assembly; remove nuts, washers, and bolts.

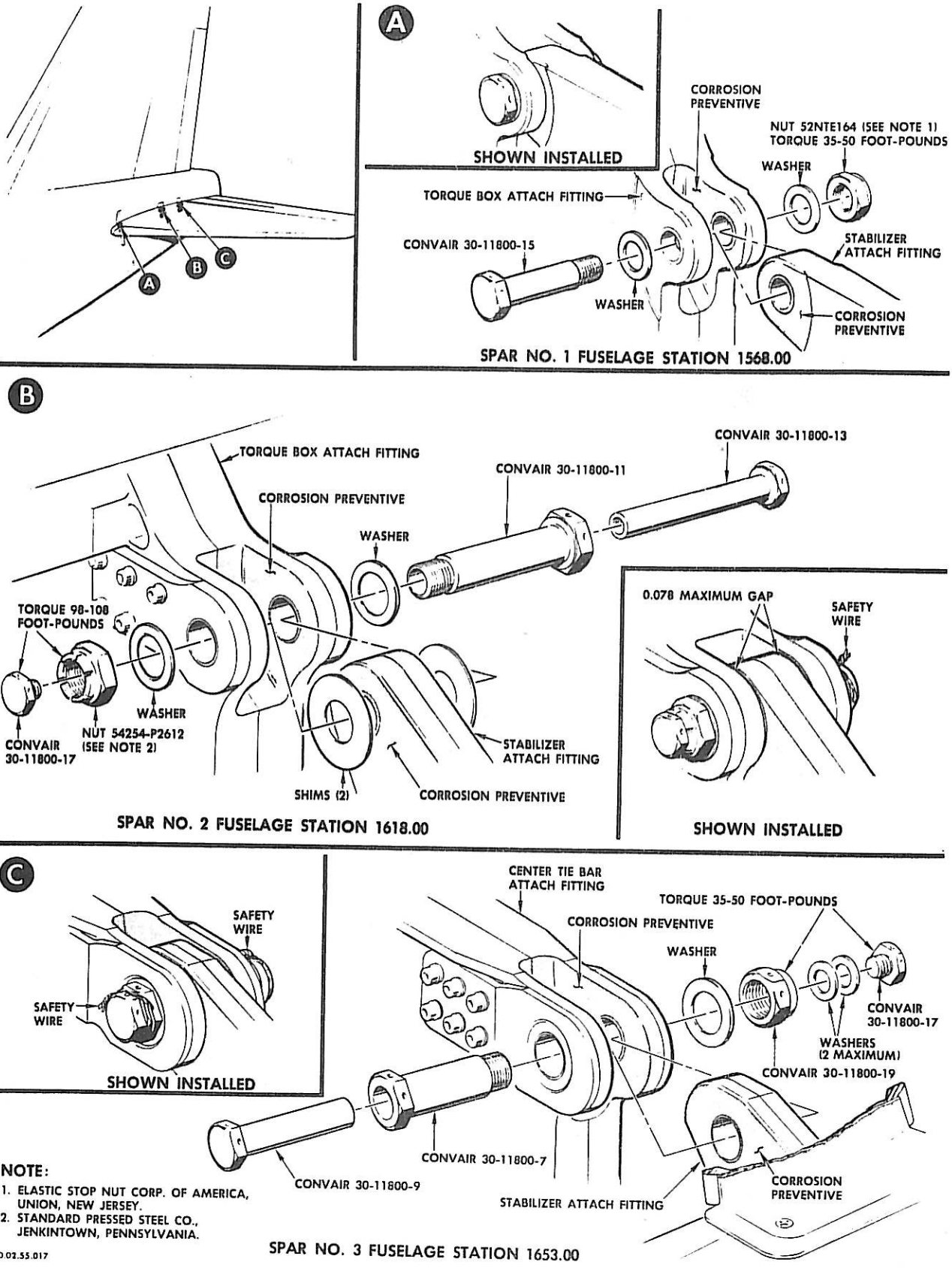
(b) Remove shims between torque box attach fitting and stabilizer spar attach fitting.

(19) Make sure that horizontal stabilizer and elevator are properly supported on positioning stand and move stand away from fuselage.

(20) Lower horizontal stabilizer, elevator, and positioning stand to ground level.

(21) Remove elevator assembly from horizontal stabilizer as directed in Chapter 27, FLIGHT CONTROL. Stow elevator assembly in an approved storage rack.

(22) Attach load bar and hoisting beams, or an equivalent lifting unit, to horizontal stabilizer as follows:




**NOTE:**

1. ELASTIC STOP NUT CORP. OF AMERICA, UNION, NEW JERSEY.
2. STANDARD PRESSED STEEL CO., JENKINTOWN, PENNSYLVANIA.

30.02.55.017

Horizontal Stabilizer to Fuselage
Bolt Installation
Figure 403

(a) Position shortest pair of padded hoisting beams over outboard stabilizer area, and longest pair over inboard area.

(b) Insert hoist hook in load bar clevis and position bar over both hoisting beam centers of attachment.

(c) Secure load bar to hoisting beams with large bolts and nuts provided with assembly.

(d) Carefully space inboard and outboard hoisting beams in order to properly balance horizontal stabilizer. Tighten spacer cables between beams enough to secure safe attachment.

(23) Operate hoist to support weight of horizontal stabilizer; lower into an approved storage rack.

(24) Remove load bar and hoisting beams from horizontal stabilizer.

E. Install Horizontal Stabilizer.

(1) Prepare airplane and horizontal stabilizer for installation in accordance with paragraph C above.

(2) Attach load bar and hoisting beams, or an equivalent lifting unit, to horizontal stabilizer as directed in paragraph D. (20).

(3) Lift horizontal stabilizer and place on positioning stand; refer to Figure 401.

(4) Install elevator assembly on horizontal stabilizer as directed in Chapter 27, FLIGHT CONTROL.

(5) Place torque box support fixture below rear spar of stabilizer torque box to align torque box attach fittings with stabilizer spar attach fittings; refer to Figure 402.

(6) Lubricate pivot bearing as directed in Chapter 12, SERVICING.

(7) Prior to mating fuselage and stabilizer attach fittings apply a coating of corrosion preventive, Specification MIL-C-16173, Grade 3, to mating surface of fittings; refer to Figure 403.

(8) Position stabilizer in position and insert stabilizer spar attach fittings into fuselage fitting cutouts.

(9) At fuselage station 1568.00 install nut and bolt assemblies to torque box attach fittings and stabilizer spar attach fittings; do not tighten; refer to Figure 403.

(10) At fuselage station 1653.00 position center tie bar and install nut and bolt assemblies to center tie bar stabilizer attach fittings and stabilizer spar attach fittings; do not tighten; refer to Figure 403.

(11) At fuselage station 1618.00 using shims as required to maintain 0.078 inch maximum gap, install nut and bolt assemblies to torque box attach fittings and stabilizer spar attach fittings; do not tighten; refer to Figure 403.

(12) Torque nut and bolt assemblies at horizontal stabilizer to torque box and center tie bar attach fittings installed in steps (8), (9) and (10) above; refer to Figure 403 for torque values.

(13) Install lockwire per MS33540; refer to Figure 403 for locations.

(14) Uncoil electrical harness at stabilizer; route and clip from stabilizer to permanent splice on top forward center of torque box; refer to Figure 404.

(15) Install ground wire to ground stud on seal retainer at fuselage station 1568.00.

(16) Connect harness wires at permament splice area as directed in NOTES section of 990 Wiring Diagram Manual.

(17) Make certain that protective sleeving is properly located and secured on harness wires; refer to Figure 404.

(18) Remove identification tags from harness wires at permanent splice.

(19) Install shims as required on spindle outboard of pivot bearing spacer to maintain a dimension of 0.190 (±0.010) inch between pivot bearing spacer and spacer inboard of auxiliary tab static levers.

(20) Install inboard and outboard auxiliary tab static levers on spindle as directed in Chapter 27, FLIGHT CONTROL.

(21) Connect elevator auxiliary tab control rods to auxiliary tab static levers as directed in Chapter 27, FLIGHT CONTROL.

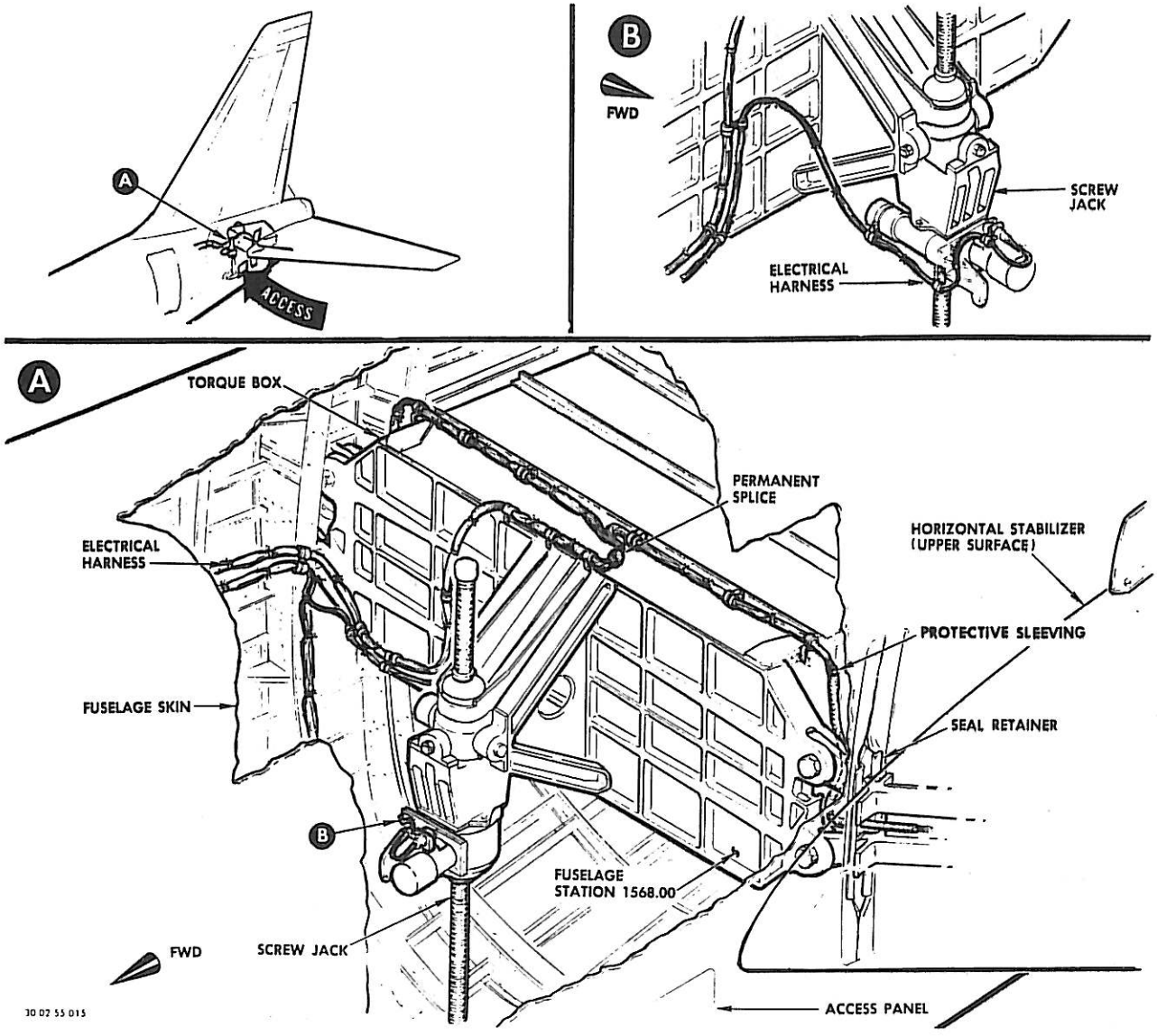
(22) Connect elevator flight tab control rod through center of stabilizer pivot spindle as directed in Chapter 27, FLIGHT CONTROL.

(23) Remove torque box support fixture below rear spar of stabilizer torque box.

(24) Install seal retainer at seal cutout at fuselage station 1568.00; refer to 55-1-8.

(25) Install seal at fuselage-to-stabilizer attach point cutout, fuselage station 1568.00; refer to 55-1-8.

(26) Install upper and lower surface sealing blades at fuselage cutouts for stabilizer attach points, fuselage stations 1618.00 and 1653.00; refer to 55-1-8.




Horizontal Stabilizer Electrical Harness Connections
Figure 404

(27) Perform adjustment/test on elevator flight tab and auxiliary tab control rods as directed in Chapter 27, FLIGHT CONTROL.

F. Restore Condition of Airplane.

(1) Reinstall access doors removed to gain access to stabilizer attachments; refer to Chapter 12, SERVICING.

(2) Close circuit breakers on main circuit breaker panel as listed below; refer to Chapter 24, ELECTRICAL POWER, for location of circuit breakers. Remove warning sign from panel.

(a) TAIL DE-ICE INPUT AND CONT.

(b) BAL. BOARD INLET ANTI-ICE L/H and R/H.

(3) Close aft fuselage access door; refer to Chapter 12, SERVICING.

(4) Remove work stands.

(5) Accomplish adjustment/test as follows:

(6) Install stabilizer-to-fuselage seal below pivot bearing; refer to 55-1-8.

| SYSTEM | CHAPTER REFERENCE |
|---|---|
| Horizontal Stabilizer Trim | 27, FLIGHT CONTROL |
| Elevator Control | 27, FLIGHT CONTROL |

2. Removal/Installation - Horizontal Stabilizer Pivot Bearing Assembly (see Figure 405)

A. General.

Removal/installation procedure for the LH and RH horizontal stabilizer pivot bearing assembly is identical.

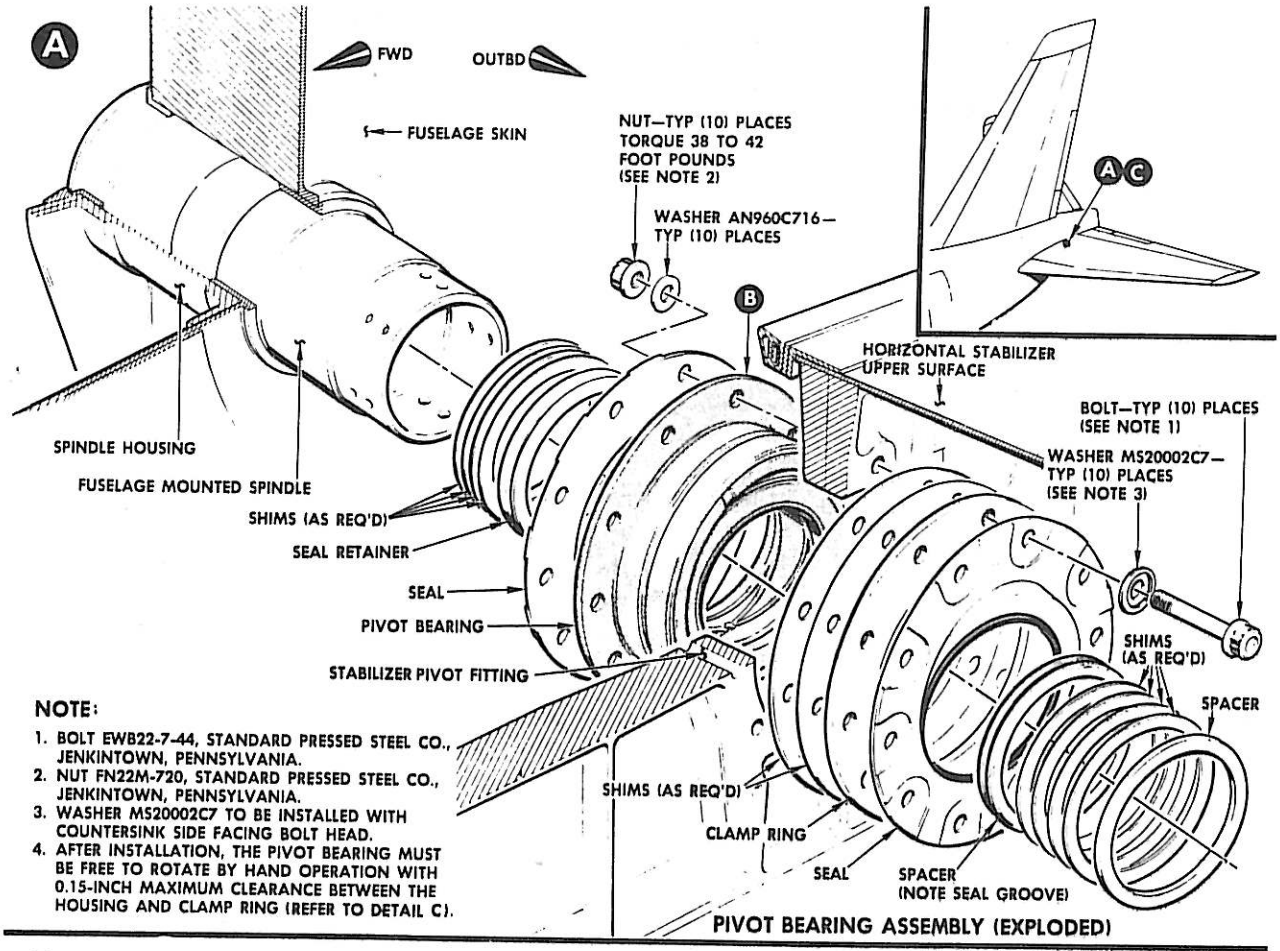
B. Equipment Required.

(1) Suitable work stand.

(2) Torque wrench calibrated in foot-pounds.

C. Preparation.

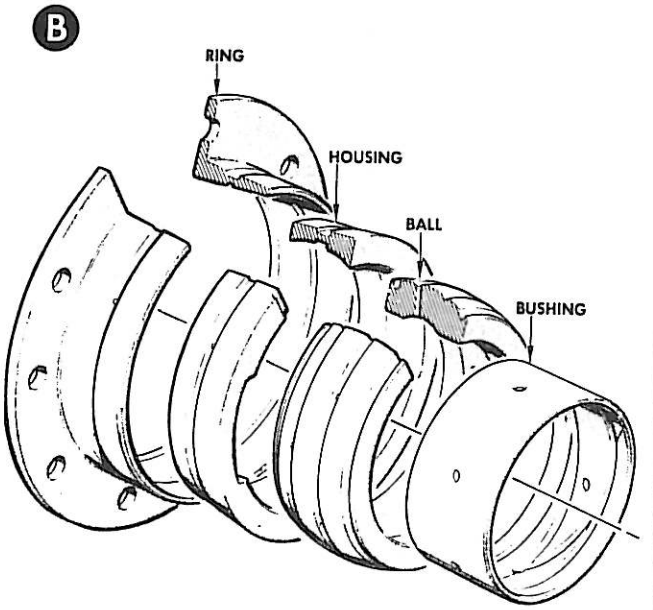
(1) Remove horizontal stabilizer as directed in Paragraph 1, Removal/Installation - Horizontal Stabilizer.




**NOTE:**

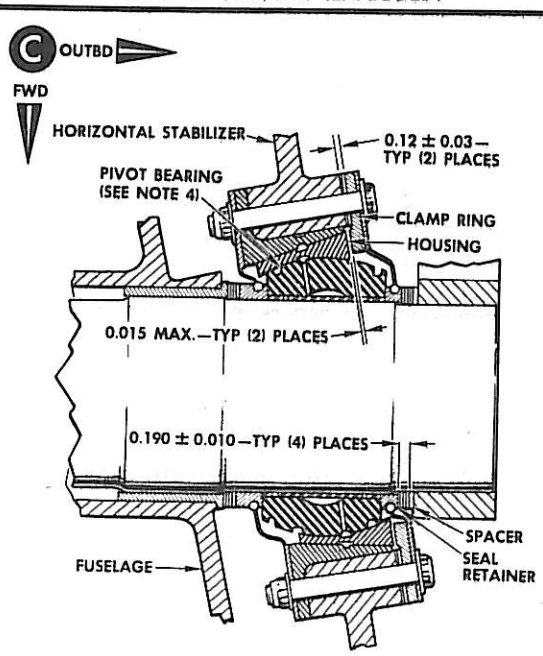
1. BOLT EWB22-7-44, STANDARD PRESSED STEEL CO., JENKINTOWN, PENNSYLVANIA.
2. NUT FN22M-720, STANDARD PRESSED STEEL CO., JENKINTOWN, PENNSYLVANIA.
3. WASHER MS20002C7 TO BE INSTALLED WITH COUNTERSINK SIDE FACING BOLT HEAD.
4. AFTER INSTALLATION, THE PIVOT BEARING MUST BE FREE TO ROTATE BY HAND OPERATION WITH 0.15-INCH MAXIMUM CLEARANCE BETWEEN THE HOUSING AND CLAMP RING (REFER TO DETAIL C).

**PIVOT BEARING ASSEMBLY (EXPLODED)**




30 02 55 011

**PIVOT BEARING**




**PIVOT BEARING ASSEMBLY (INSTALLED)**

Horizontal Stabilizer Pivot Bearing Installation
Figure 405

D. Remove Pivot Bearing Assembly.

(1) Remove nuts, washers, and bolts attaching pivot bearing assembly to stabilizer pivot fitting as shown in Figure 405.

NOTE: Bag and tag all loose parts for ease of reinstallation.

(2) Remove and disassemble pivot bearing as shown in Figure 405.

E. Install Pivot Bearing Assembly.

(1) The following must be accomplished prior to installation of the pivot bearing:

(a) Check dry film lubricant of bushing I.D., spherical diameter of housing, and O.D. of ring. The coating shall be free of cracks, blisters, and foreign matter and shall be a continuous homogeneous coating of uniform thickness and color.

WARNING: EACH PIVOT BEARING IS A MATCHED SET OF DETAIL PARTS; DETAILS FROM ONE ASSEMBLY ARE NOT INTERCHANGEABLE WITH ANOTHER ASSEMBLY.

(2) Assemble pivot bearing as shown in Figure 405.

(3) Install pivot bearing assembly as shown in Figure 405.

(4) Install horizontal stabilizer as directed in Paragraph 1, Removal/Installation Horizontal Stabilizer.

3. Removal/Installation - Horizontal Stabilizer Pivot Bearing Spindle (see Figure 406)

A. General.

Removal/Installation procedure for the LH and RH horizontal stabilizer spindle is identical.

B. Equipment Required.

(1) Suitable work stand.

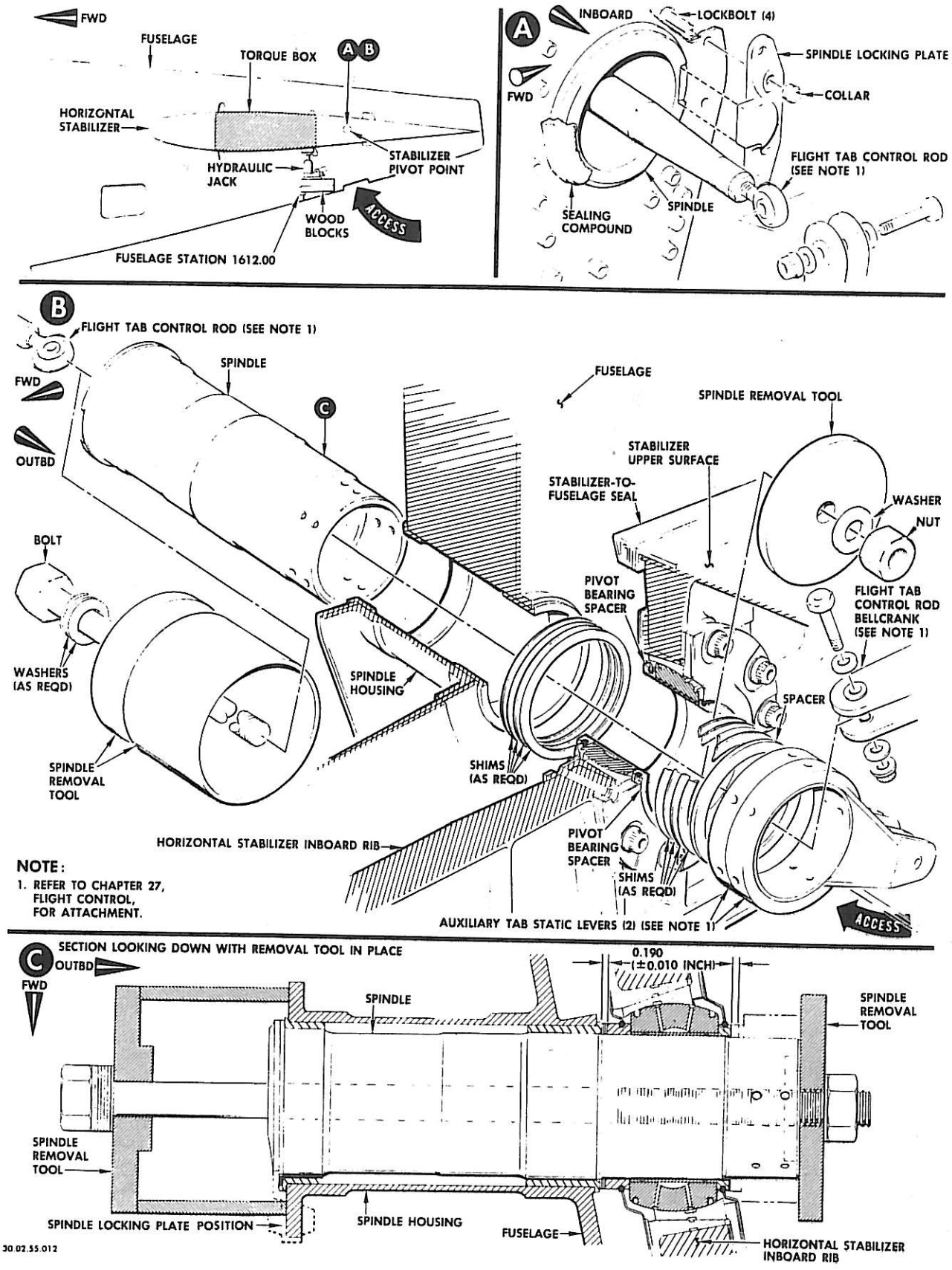
(2) One-ton hydraulic jack.

(3) Grease, Specification MIL-L-7711.

(4) Plastic scraper for removing old sealant.

(5) Clean, lint-free cloths.

(6) Aliphatic naphtha, Federal Specification TT-N-95a.




Horizontal Stabilizer Pivot Bearing Spindle Installation
Figure 406

(7) Sealant EC 1293, 3M Co., St. Paul 6, Minn., or equivalent.

(8) Spindle removal tool as shown in Figure 406, or equivalent.

C. Remove Spindle.

(1) Place hydraulic jack under aft corner of torque box (on same side as spindle being removed).

NOTE: Hydraulic jack must be applied to prevent aft portion of torque box from dropping down, causing damage to stabilizer-to-fuselage attach point cutouts in fuselage skin.

(2) Remove elevator flight tab control rod from center of stabilizer pivot spindle as directed in Chapter 27, FLIGHT CONTROL.

(3) Remove Huck lockbolts from spindle locking plate; refer to Structural Repair Manual, Chapter 13, STANDARD PRACTICES - AIRFRAME.

NOTE: Bag and tag all loose parts for ease of reinstallation.

(4) Disconnect auxiliary tab control rods from inboard and outboard auxiliary tab static levers as directed in Chapter 27, FLIGHT CONTROL.

(5) Remove bolts securing auxiliary tab static levers, spacer, and shims to spindle.

(6) Remove stabilizer-to-fuselage seal below pivot bearing; refer to 55-1-8.

(7) Remove auxiliary tab static levers, spacer, and shims from spindle.

(8) Disconnect elevator flight tab bellcrank as directed in Chapter 27, FLIGHT CONTROL.

(9) Using a clean cloth dampened with aliphatic naphtha and a plastic scraper, remove old sealant from around inboard end of spindle.

(10) Using spindle removal tool, remove spindle as shown in Figure 406.

CAUTION: SHIMS MAY FALL FREE BETWEEN PIVOT BEARING SPACER AND SPINDLE HOUSING.

D. Install Spindle.

(1) Apply a light coat of grease to outside surface of spindle.

(2) Insert spindle through spindle housing, install shims as required to maintain a dimension of 0.190 (±0.010) inch between spindle housing and pivot bearing spacer as shown in Figure 406.

(3) Insert spindle through pivot bearing assembly with spindle locking plate cutout facing forward.

(4) Using a clean cloth dampened with aliphatic naphtha, clean inboard end of spindle.

CAUTION: DO NOT PERMIT ALIPHATIC NAPHTHA TO PENETRATE BETWEEN PIVOT SPINDLE AND BUSHING.

(5) Apply EC 1293 sealant around inboard end of stabilizer pivot spindle as shown in Figure 406. Refer to Chapter 51, STRUCTURES-GENERAL, for application of sealants.

(6) Install shims as required on spindle outboard of pivot bearing spacer to maintain a dimension of 0.190 (±0.010) inch between pivot bearing spacer and spacer inboard of auxiliary tab static lever as shown in Figure 406.

(7) Install inboard and outboard auxiliary tab static levers as directed in Chapter 27, FLIGHT CONTROL.

(8) Install spindle locking plate using four Huck lockbolts; refer to Structural Repair Manual Chapter 13, STANDARD PRACTICES - AIRFRAME, for Huck lockbolt installation.

(9) Connect elevator flight tab bellcrank as directed in Chapter 27, FLIGHT CONTROL.

(10) Connect elevator auxiliary tab control rods to inboard and outboard auxiliary tab static levers as directed in Chapter 27, FLIGHT CONTROL.

(11) Connect elevator flight tab control rod through center of stabilizer pivot spindle as directed in Chapter 27, FLIGHT CONTROL.

(12) Perform adjustment/test on elevator control rods as directed in Chapter 27, FLIGHT CONTROL.

(13) Remove hydraulic jack from under rear spar of torque box.

E. Restore Condition of Airplane.

(1) Install access doors on lower surface of stabilizer; refer to Chapter 12, SERVICING.

(2) Close aft fuselage access door; refer to Chapter 12, SERVICING.

(3) Install stabilizer-to-fuselage seal below pivot bearing; refer to 55-1-8.

## HORIZONTAL STABILIZER - INSPECTION/CHECK

1. Inspection/Check Horizontal Stabilizer

A. Access.

(1) Remove access panels in the interspar assembly upper and lower surfaces and in the inboard trailing edge section.

(2) Open trailing edge shroud panels and pressure board mechanism access doors.

(3) Remove access panels and hinge fairings on lower surface of the elevator and flight tabs.

B. Check the Following:

(1) Stabilizer upper and lower skins for cracks, corrosion, loose fasteners, and general condition.

(2) Leading edges for cracks, corrosion, loose fasteners, and general condition. Check stainless steel skins and de-icing pads for delamination.

(3) Tip assembly for cracks, corrosion, loose fasteners, and general condition.

(4) Stabilizer-to-fuselage silicone rubber seals for condition and security.

(5) Stabilizer pivot bearing installation and supporting structure for condition, security of attachment, and freedom of movement.

(6) Pressure boards, pressure board baffles, restrictors, and seals for condition and security.

(7) Front and rear spars, stringers, ribs, and intercostals for deformation, cracks, corrosion, and loose fasteners.

(8) Jack screw attach fitting for condition and security.

(9) Torque box and stabilizer attach fittings for condition and security of attachment; surrounding structure for general condition.

(10) Accessory mounting brackets for deformation, cracks, corrosion, and loose fasteners.

(11) Elevator, auxiliary tab and flight tab structure for cracks, corrosion, and loose fasteners.

(12) Elevator, auxiliary tab and flight tab hinge fittings and supports for condition. Check hinge bearings for freedom of rotation and hinge bolts for security.

(13) Elevator, pressure board, and tab actuating systems for general condition, freedom of movement, and security.

# HORIZONTAL STABILIZER INTERSPAR ASSEMBLY - DESCRIPTION AND OPERATION

## 1. Description

The interspar box-beam assemblies constitute the primary structural components of the horizontal stabilizer. Each assembly consists of a front, center, and rear spar; ribs, and spanwise plate-stringer skin panels. Stressed access panels of chemically-milled aluminum alloy sheet are located in the lower surface of each assembly.

The front and center spar fittings of the interspar box-beam assemblies attach to the front and rear spar fittings of the torque box assembly at fuselage stations 1569 and 1619 respectively. The rear spar fittings of the interspar box-beam assemblies are interconnected by a large center tie at fuselage station 1653.

## 2. Structure

The horizontal stabilizer spar assemblies are of built-up construction consisting of aluminum alloy fittings, webs, and stiffeners. The ribs are built-up assemblies with extruded rails and stiffeners. Truss-type ribs introduce air-loads imposed on the stabilizer into the interspar assembly and counteract loads developed by bending curvature. Web-type ribs transmit the elevator hinge loads or stabilizer pivot loads into the interspar assembly. The plate-stringer skin panels attach to the ribs and spars to form the stabilizer contour line.

The stringers are extruded "J" and "Z" sections. The upper surface stringers are of 2024 aluminum alloy and the lower stringers are of 7075 aluminum alloy. A ram air plenum chamber, located between ribs No. 4 and No. 5, furnishes airflow to the pressure board areas. Two roll-tapered 2024 aluminum alloy skin panels provide the upper surface for the interspar assembly and three 7075 aluminum alloy skin panels for the lower surface.

The upper and lower skin panels are a maximum thickness of 0.080-inch at the root, tapering to 0.040-inch at approximately the midspan position. From the midspan location to the stabilizer tip, the upper and lower skin panels remain a constant 0.040-inch thickness. The skin panels have butt-type joints, and flush-type rivets are installed on the exterior surfaces of the horizontal stabilizer.

Large splice plates of 7075 aluminum alloy are installed at the intersection of the center spar and root rib assemblies. The tapered and machined plates are riveted to the top and bottom surfaces of the horizontal stabilizer to transmit loads from the attach fittings into the interspar assembly.

# HORIZONTAL STABILIZER TORQUE BOX ASSEMBLY AND REAR SPAR CENTER TIE - DESCRIPTION AND OPERATION

## 1. Description

The horizontal stabilizer torque box assembly is located within the fuselage between stations 1569 and 1619. The assembly structure serves as the interconnecting unit for the left and right interspar box-beam assemblies and provides the forward support area for the screwjack bracket fitting assembly. The rear spar center tie is a built-up link assembly to interconnect the No. 3 spars of the interspar box-beam assemblies at fuselage station 1653.

## 2. Structure

The torque box structure consists of front and rear spar assemblies, webs, ribs, and stiffeners. The upper surface of the torque box is of 2024 aluminum alloy and the lower surface is of 7075 aluminum alloy. Five access panels in the upper surface and one in the lower surface permit access to the interior of the torque box assembly. The screwjack bracket fitting assembly, built up of three fittings and two webs, is installed on the front spar assembly with high-shear bolts.

The rear spar center tie structure consists of 7079 aluminum alloy forgings and plates fastened together by high-shear bolts and by lockbolts.

# HORIZONTAL STABILIZER LEADING EDGE - DESCRIPTION AND OPERATION

## 1. Description

The horizontal stabilizer leading edge assembly consists of three large main sections and a shorter inboard stub section. The leading edge sections are secured with flush-head screws to the front spar rails of the stabilizer interspar assembly. Silicon rubber seals are installed between the three main leading edge sections to provide aerodynamic sealing. The large inboard leading edge section incorporates a ram air inlet which routes air to the ram air plenum chamber mounted in the stabilizer interspar assembly. Electrically heated de-icing blankets are bonded to all leading edge sections, except the short inboard stub sections.

## 2. Structure

Each leading edge section, except the stub section, consists of a laminated skin stiffened by hydropressed aluminum alloy ribs. The main leading edge sections are flush-riveted to extruded doublers. The doublers, in turn, are secured to the interspar assembly front spar rails with flush-head screws. The ram air inlet support is a welded tube and curved doubler assembly of 5052 aluminum alloy riveted to the front of the leading edge section at wing spar station 115. The ram air inlet tube is secured within the inlet support assembly by six flush-head bolts.

The stub leading edge section has a single outer skin of 2024 aluminum alloy and has no doublers at attachment to the interspar assembly spar rails. A seal strip around the inboard edge of the stub leading edge section provides aerodynamic sealing at the fuselage area.

The laminated skins of the three main leading edge sections consist of 2024 aluminum alloy sheet flush-riveted to the ribs, a fiberglas bonding material with embedded electrical heater strips for thermal de-icing; and a stainless steel foil outer skin.

## HORIZONTAL STABILIZER LEADING EDGE - MAINTENANCE PRACTICES

### 1. Removal/Installation Horizontal Stabilizer Leading Edge (see Figure 201)

A. General.

The left and right horizontal stabilizer leading edges are divided into three large main sections and a shorter inboard stub section. Except for the inboard stub section, any one of the leading edge sections can be removed from the stabilizer front spar without removing the other sections. In addition to disconnecting de-icing harness wires at the permanent splice area, it is necessary to disconnect the ram air tube hose and clamps before the large inboard leading edge section can be removed from the airplane.

B. Equipment Required - None.

C. Remove Horizontal Stabilizer Leading Edge.

(1) Open circuit breakers on main circuit breaker panel as listed below. Refer to Chapter 24, ELECTRICAL POWER, for locations. Hang a warning sign on panel.

(a) ANTI-ICE CONT, TAIL

(b) STAB TRIM CONT

(c) STAB TRIM CONT EMER

(2) Position a maintenance stand of sufficient height at front edge of horizontal stabilizer to facilitate removal of leading edge section.

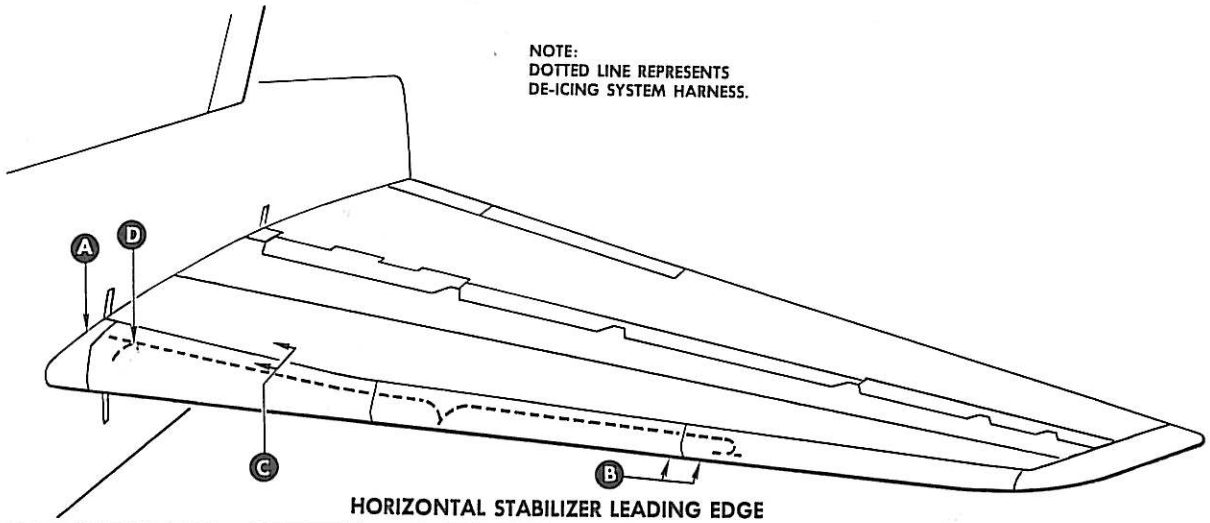
NOTE: When removing inboard leading edge section with ram air inlet, it is necessary to remove screws securing inboard end of section to stub section. The access panel at wing spar station 115 must also be removed to gain access to the air ducts. (Bag and tag screws for installation). Loosen hose clamps and slide hose aft from ends of air ducts.

(3) Remove screws securing lower surface of leading edge section to stabilizer front spar (Bag and tag screws for installation).

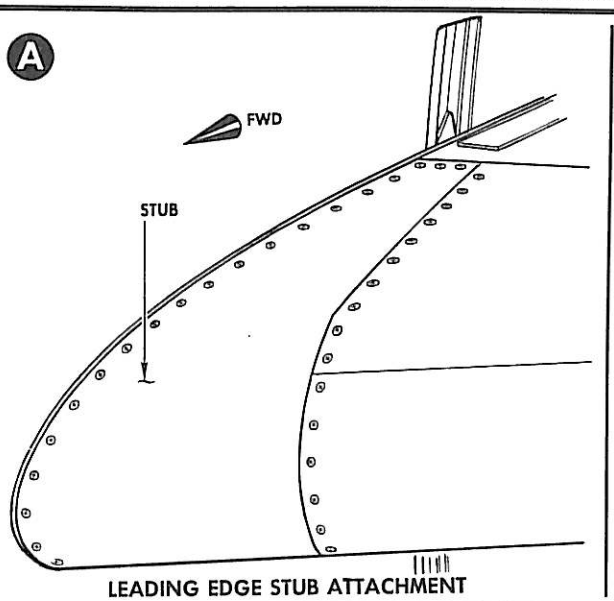
(4) While supporting leading edge section, remove screws securing upper surface to stabilizer front spar.

CAUTION: SUPPORT LEADING EDGE SECTION BEFORE REMOVING ALL SCREWS TO PREVENT IT FROM FALLING AND DAMAGING DE-ICING SYSTEM ELECTRICAL COMPONENTS.

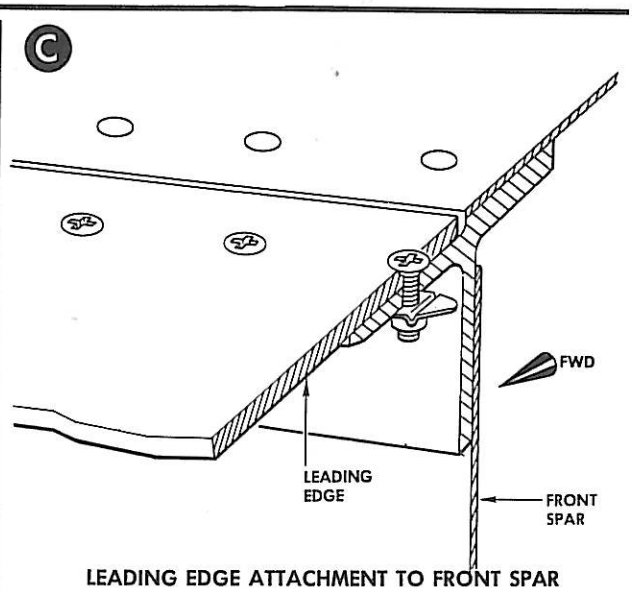
(5) Slip leading edge section from stabilizer front spar and carefully lower section enough to gain access to de-icing wire harness and clamps.



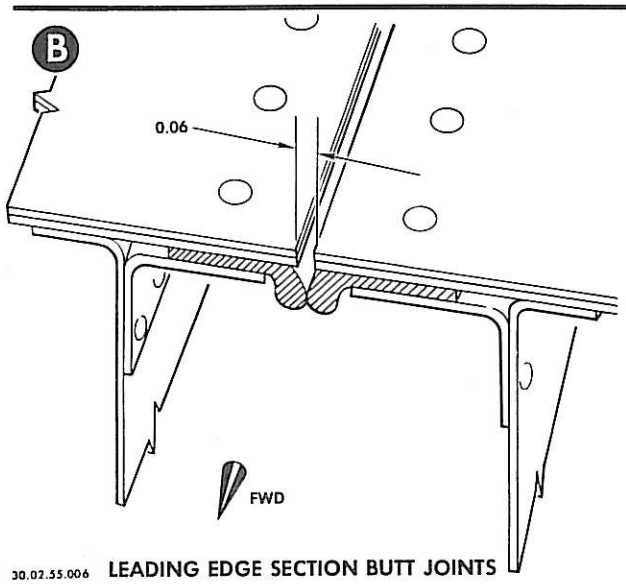

HORIZONTAL STABILIZER LEADING EDGE



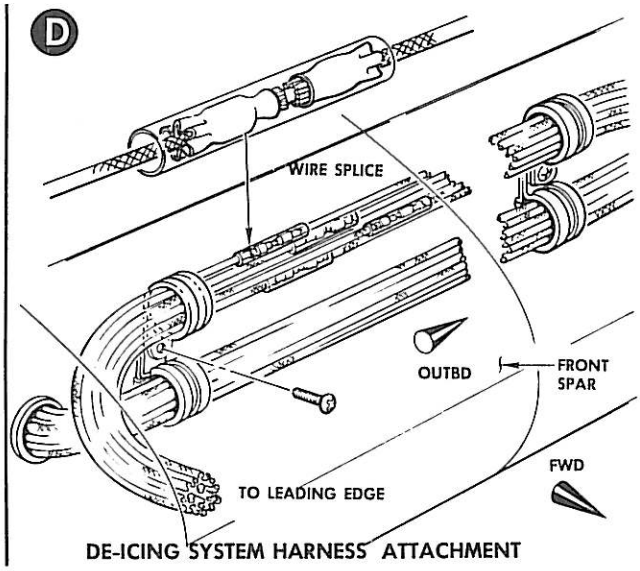

LEADING EDGE STUB ATTACHMENT




LEADING EDGE ATTACHMENT TO FRONT SPAR




30.02.55.006 LEADING EDGE SECTION BUTT JOINTS




DE-ICING SYSTEM HARNESS ATTACHMENT

(6) Remove clamps in area of permanent splice for de-icing wires in leading edge section being removed. (Bag and tag loose parts for installation.)

(7) Disconnect wires at permanent splice and tag for installation.

(8) Lift leading edge section clear of horizontal stabilizer and secure loose wires to rear of removed section.

D. Install Horizontal Stabilizer Leading Edge.

(1) Check that circuit breakers on main circuit breaker panel as listed below, are open.

(a) ANTI-ICE CONT, TAIL

(b) STAB TRIM CONT

(c) STAB TRIM CONT EMER

(2) Place a maintenance stand of sufficient height at front of horizontal stabilizer to facilitate installation of leading edge section.

NOTE: When installing inboard leading edge section with ram air inlet, check that access panel is removed at wing spar station 115. Also check that hose and clamps are loosely installed on aft air duct.

(3) Cut ties stowing loose wires at rear of leading edge section and then support section in front of stabilizer front spar.

(4) Connect de-icing harness wires at permanent splice area. Refer to Wiring Diagram Manual, Chapter 30, ICE AND RAIN PROTECTION, for circuits. Refer to NOTES for permanent splicing procedure. Remove wire identification tags.

(5) Install clamps to secure de-icing harness adjacent to permanent splice area.

(6) Lift leading edge section into position, aligning screw holes with those in stabilizer front spar rail.

NOTE: When installing inboard leading edge section with ram air inlet, make certain that ends of air ducts are aligned and connected by hose. Do not tighten hose clamps until section is secured to stabilizer front spar. Install screws securing inboard end of section to stub section.

(7) Install screws securing upper surface of leading edge section to stabilizer front spar.

(8) Install screws securing lower surface of leading edge section to stabilizer front spar.

NOTE: When installing inboard leading edge section with ram air inlet, tighten clamps on hose connecting air ducts after leading edge section has been secured to stabilizer front spar. Install access panel at wing spar station 115.

(9) Close circuit breakers on main circuit breaker panel as listed below. Remove warning sign from panel.

(a) ANTI-ICE CONT, TAIL

(b) STAB TRIM CONT

(c) STAB TRIM CONT EMER

(10) Perform anti-icing system Adjustment/Test procedure. Refer to Chapter 30, ICE AND RAIN PROTECTION.

(11) Clear maintenance stand from airplane area.

# HORIZONTAL STABILIZER TRAILING EDGE - DESCRIPTION AND OPERATION

## 1. Description

The area between the rear spar of the interspar assembly and the elevator hinge line comprises the horizontal stabilizer trailing edge structure. The stabilizer pivot bearing trunnions are attached to the inboard portion of the trailing edge. The remainder of the trailing edge houses the elevator pressure boards, elevator hinge mounting brackets, and the forward portion of the elevator nose boxes.

There are five hinged, trailing edge shroud panels on the upper surface and five on the lower surface of each horizontal stabilizer. Each panel has a separate pair of hinges that are attached to the rear spar with screws.

## 2. Structure

The stabilizer pivot bearing trunnions are supported by a web-type rib extending aft from the interspar assembly rear spar. Dual-path construction is used in this rib. Three additional ribs, spaced approximately seven inches apart, support the 7075 aluminum alloy trailing edge skins to form a torsion box, additional to the main structural box, for approximately 30 inches outboard of each side of the fuselage.

In the remaining portion of the trailing edge, outboard of the trailing edge skin, a pair of web-type ribs extend aft from the structural box rear spar at each of the elevator hinge support points. The distance between the two ribs at each location is approximately six inches. The mechanisms for operating the aerodynamic pressure boards are housed in these areas and are accessible through doors attached to the ribs with countersunk-head screws. The larger areas between each pair of ribs house the pressure boards and are covered by 3/4-inch aluminum alloy, honeycomb sandwich shroud panels.

# HORIZONTAL STABILIZER TIPS - DESCRIPTION AND OPERATION

## 1. Description

The stabilizer tip serves as a closure assembly comprising the outboard nine inches of the horizontal stabilizer. A formed skin of 5052 aluminum alloy is flush-riveted to ribs and doublers of 2024 aluminum alloy. A molded resin fitting, riveted to the trailing edge, completes the tapered contour opposite the elevator assembly.

The stabilizer tip is secured to the closing rib and the spars, at the outer end of the horizontal stabilizer interspar assembly, with flush-head screws. A silicone rubber seal, installed between the outboard leading edge section and the tip assembly, provides aerodynamic sealing at the joining area.

## HORIZONTAL STABILIZER TIPS - MAINTENANCE PRACTICES

1. Removal/Installation Horizontal Stabilizer Tip (see Figure 201)

A. General.

Removal and installation procedures for the horizontal stabilizer tips are identical for the left and right stabilizer sections.

B. Equipment Required. Maintenance stand suitable for reaching outboard end of horizontal stabilizer.

C. Remove Horizontal Stabilizer Tip.

(1) Position a maintenance stand of sufficient height at outer end of horizontal stabilizer to facilitate removal of tip assembly.

(2) Remove screws securing lower surface of tip assembly to closing rib and spars. (Bag and tag screws for installation.)

(3) While supporting tip assembly, remove screws securing upper surface of tip assembly to closing rib and spars.

CAUTION: SUPPORT TIP ASSEMBLY BEFORE REMOVING ALL SCREWS TO PREVENT IT FROM FALLING.

(4) Lift tip assembly clear of horizontal stabilizer, being careful not to damage rubber seal.

D. Install Horizontal Stabilizer Tip.

(1) Place a suitable maintenance stand at outer end of horizontal stabilizer to facilitate installation of tip assembly.

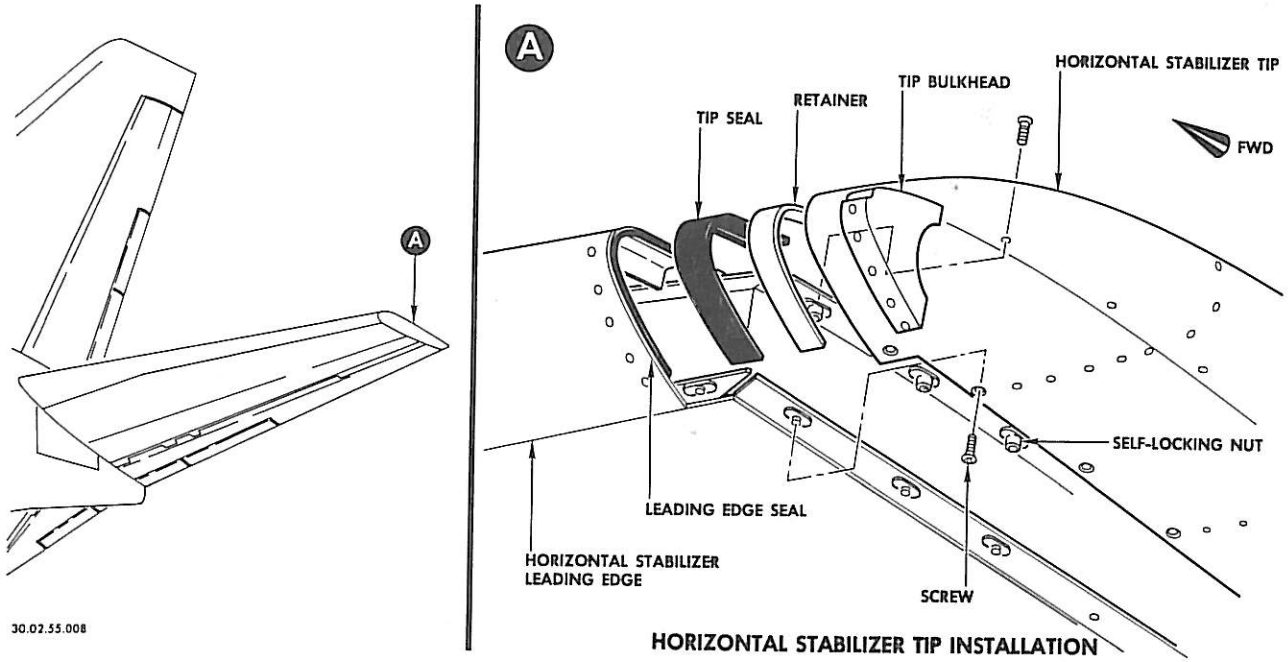
(2) Slide horizontal stabilizer tip assembly into position, aligning screw holes with those in closing rib and spars.

NOTE: When positioning tip assembly, make certain that rubber seals align at outboard leading edge section joining area.

(3) Install screws securing upper surface of tip assembly to closing rib and spars.

(4) Install screws securing lower surface of tip assembly to closing rib and spars.

(5) Clear maintenance stand from airplane area.




HORIZONTAL STABILIZER TIP INSTALLATION

# ELEVATORS - DESCRIPTION AND OPERATION

## 1. Description

Each elevator consists of a main control surface, a flight tab, and an auxiliary tab (see Figure 1). The auxiliary tab is located at the inboard end of the elevator trailing edge and hinges to the structure at three points. The flight tab is located outboard of the auxiliary tab and hinges to the elevator structure at four points. The elevator assembly hinges to the horizontal stabilizer section at six places. Except for the two spring-loaded crossover tubes in the elevator flight tab control system, there is no interconnection between the left and right elevator assemblies. For the removal and installation of elevators and their components, refer to Chapter 27, FLIGHT CONTROL.

Two pressure boards are connected to the leading edge of each elevator by struts and extend forward to a baffle on the rear side of the interspar assembly. In addition to the struts connecting the pressure boards to the elevator leading edge, each pressure board is supported at the inboard and outboard forward corners by a bellcrank arm. Seals installed around the edge of each pressure board prevent airflow from one side of the pressure board to the other. Airflow to each pressure board area is routed through a distribution duct from the ram air plenum chamber.

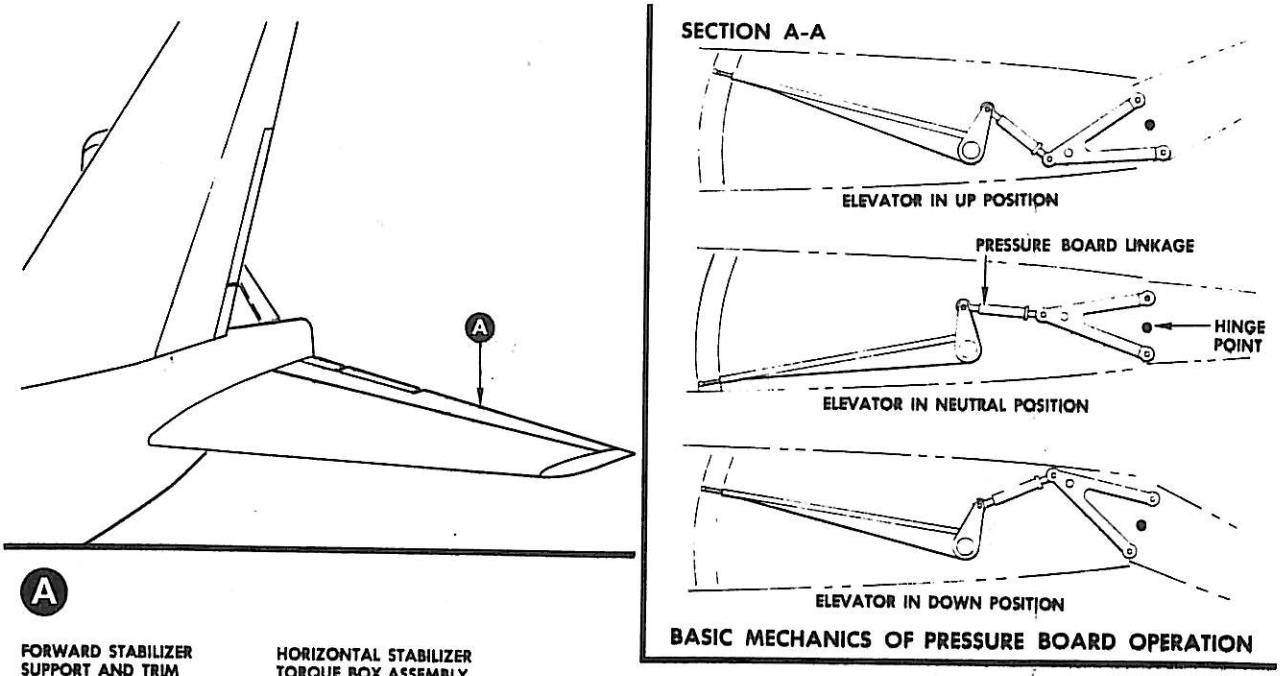
## 2. Structure

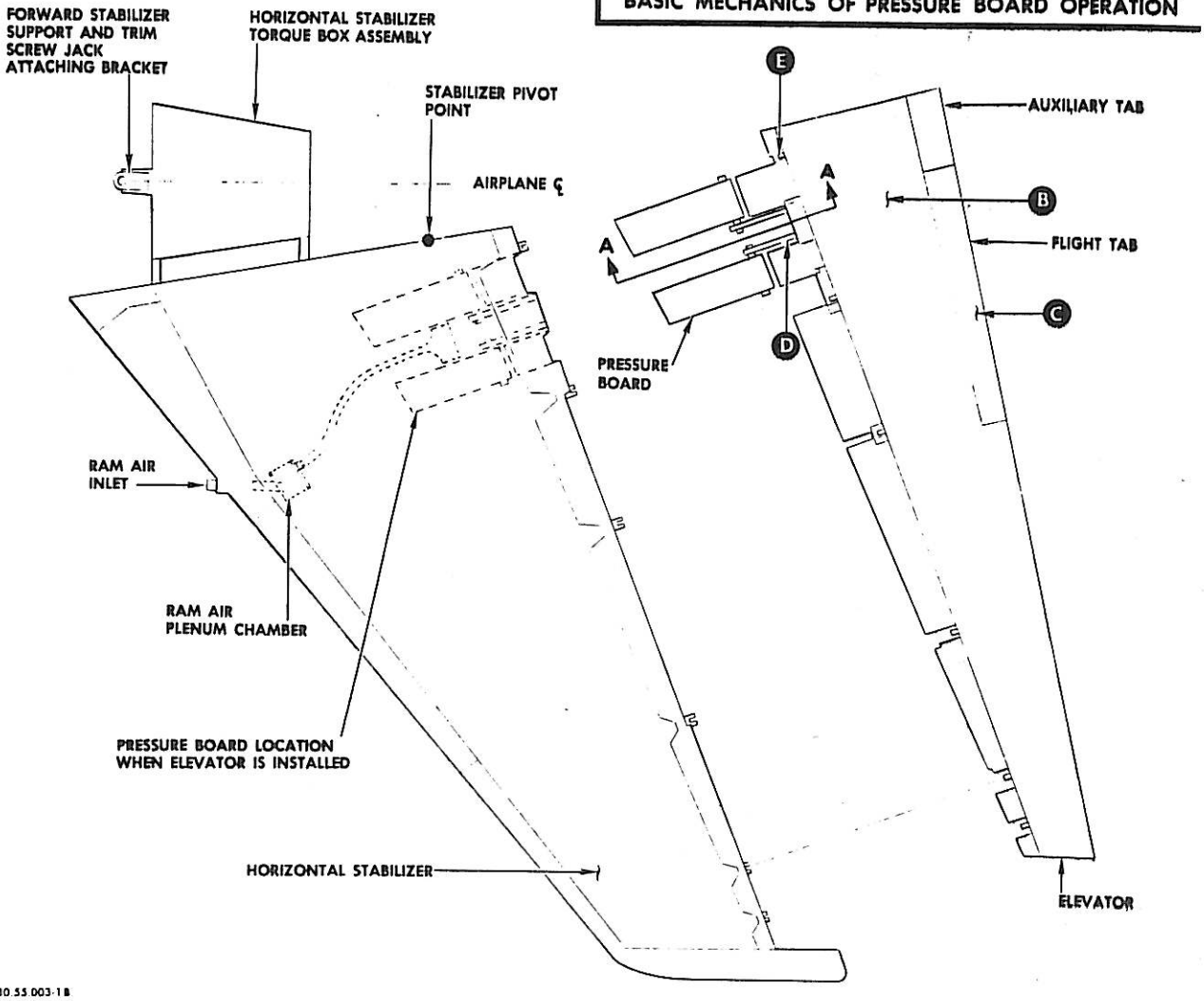
The elevator structure consists of stiffened aluminum alloy skins with doublers at attaching locations; formed ribs, and a single built-up spar. A honeycomb trailing edge wedge is located outboard of the flight tab. The 2024 aluminum alloy elevator skins are stiffened with formers. Web-type ribs are used to transmit the elevator loads into the elevator structure. A 2024 aluminum alloy doubler is bonded to the under side of the skin in the area over the ribs, formers, and spar rail. In addition, a 2024 aluminum alloy doubler extends along the spar and over the hinge ribs to aid in transferring the hinge loads into the elevator structure.

The elevator main spar is of conventional built-up construction with aluminum alloy angles and web. A closing spar of 2024 aluminum alloy near the trailing edge supports the elevator flight tab hinges.

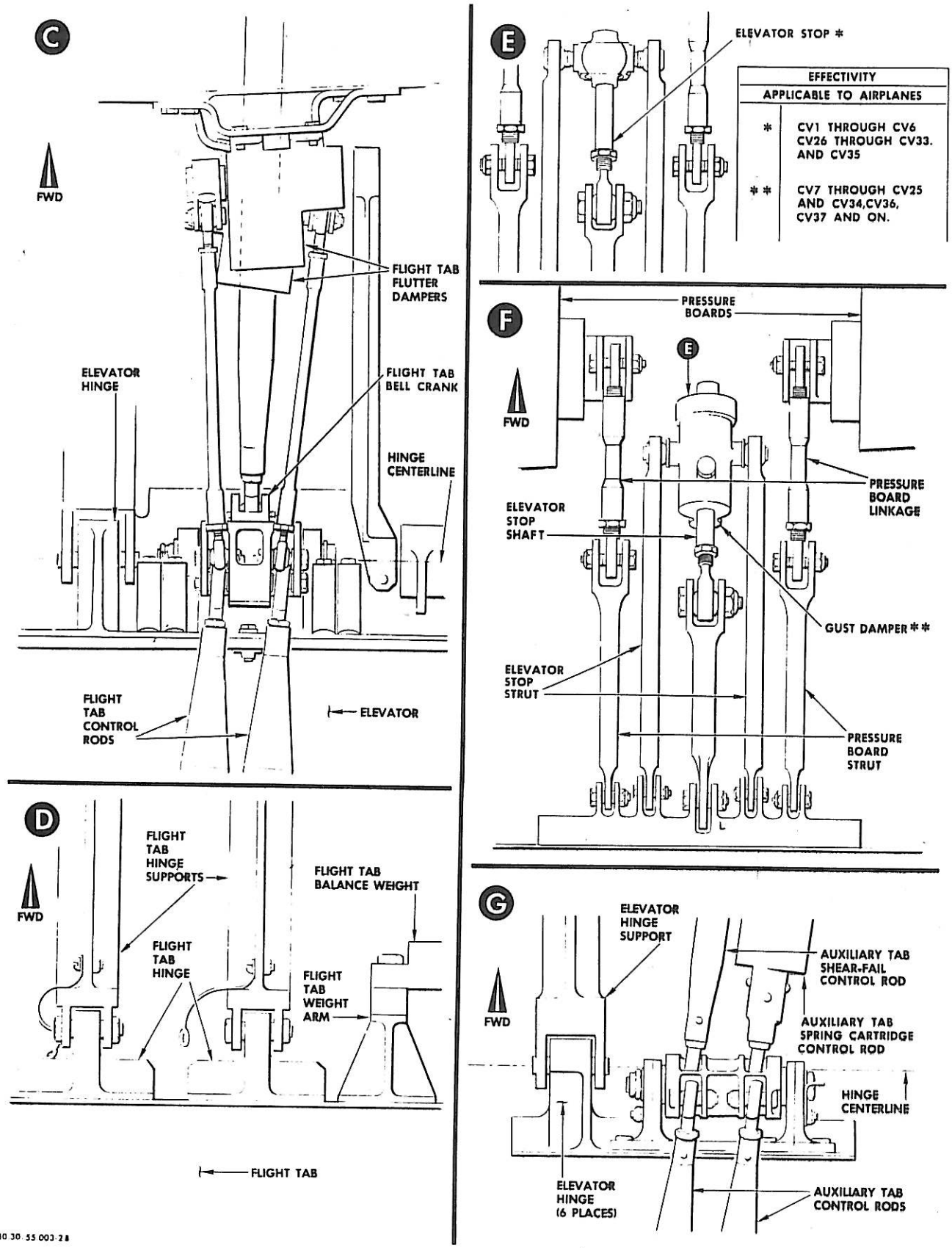
The nose box assembly extends forward of the main spar and between the elevator hinge locations. This assembly is fabricated from 2024 aluminum alloy skin stiffened with 2024 aluminum alloy hydropressed ribs.

The elevator flight and auxiliary tabs are of solid honeycomb sandwich construction with 2024 aluminum alloy skins and 5052 aluminum honeycomb core. Each tab spar is formed of 2024 aluminum alloy. A doubler along each spar extends aft in the area of the hinge fitting.




30.30.55.003-1B




30 30 55 003-28

# HORIZONTAL STABILIZER VORTEX GENERATORS - DESCRIPTION AND OPERATION

## 1. Description

Vortex generators are installed on the upper and lower surfaces of the horizontal stabilizer.

The purpose of these vortex generators is to ensure sufficient airflow over the elevator to effect control maneuvers.

## 2. Structure

The upper projecting surface of each installed vortex generator is convex to increase the airflow over the part. Each side of the vortex generator base is chamfered to reduce drag.

## HORIZONTAL STABILIZER VORTEX GENERATORS - MAINTENANCE PRACTICES

1. Removal/Installation Horizontal Stabilizer Vortex Generators (see Figure 201)

   A. Equipment Required.

      (1) Plastic spatula.

      (2) Methyl ethyl ketone (MEK), Specification TT-M-261, or equivalent.

      (3) Clean, lint-free cloth (several feet).

      (4) EC1291, 3M Co., St. Paul 6, Minn., or equivalent.

      (5) Tape, JAN-P-127, Type 1, or equivalent.

   B. Remove Horizontal Stabilizer Vortex Generators.

      (1) Apply a liberal amount of MEK around faying surface edges of the vortex generator base.

      (2) Insert plastic spatula under edge of the vortex generator. Apply enough prying pressure to remove part.

      (3) Remove remaining EC 1291 with plastic spatula and cloth dampened with MEK.

         NOTE: Observe position of vortex generator for aid in installing new part.

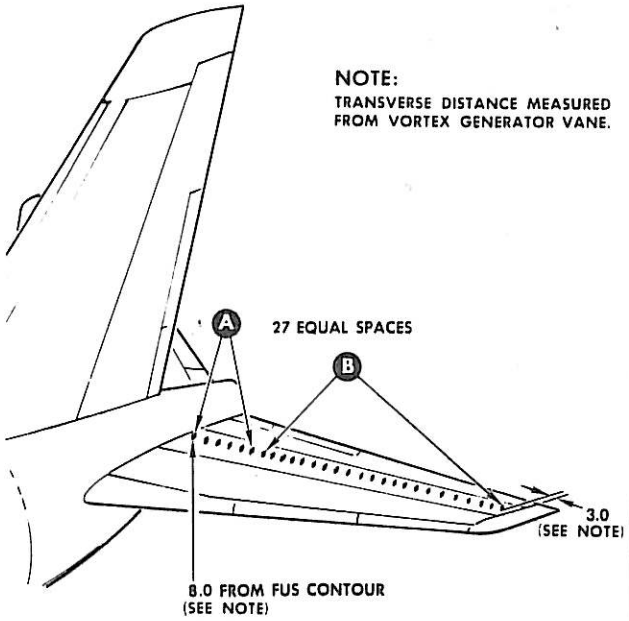
   C. Install Horizontal Stabilizer Vortex Generators.

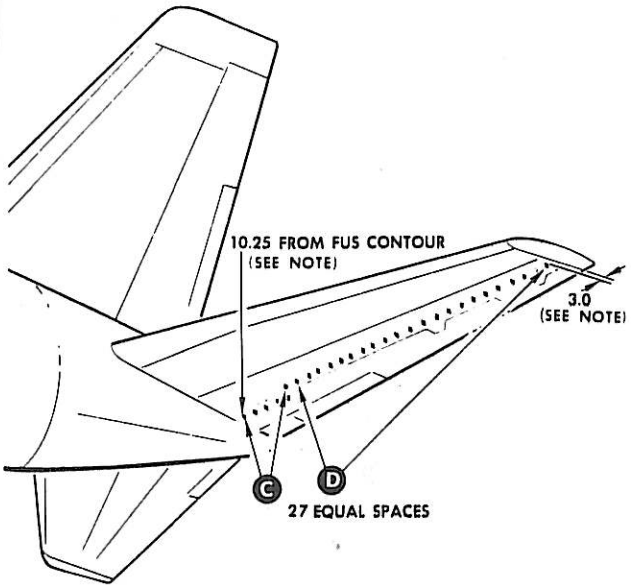
      (1) Remove all contaminants such as dirt, paint, grease, and other foreign matter from surface to which vortex generator is to adhere, with cloth dampened with MEK.

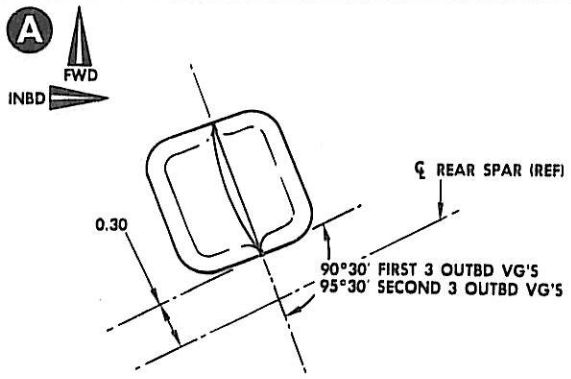
      (2) Apply gloss gray epoxy top coat to all vortex generator surfaces, except the base, when installation is intended in areas where skin surfaces do not receive decorative finish, as directed in Chapter 51, STRUCTURES - GENERAL. Apply applicable decorative finish to all vortex generator surfaces, except the base, when installation is intended in areas where skin surfaces receive decorative finish, as directed in Chapter 51, STRUCTURES - GENERAL.

      (3) Determine correct location of vortex generators as shown on Figure 201.

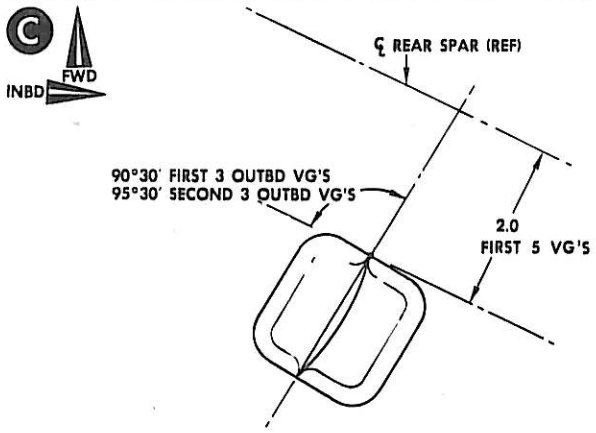
      (4) Apply a thin coat of EC 1291 (approximately 1/64-inch) to faying surface of the vortex generator base.



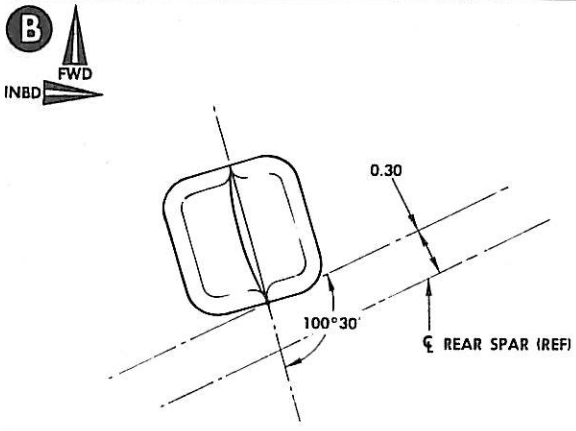




VIEW LOOKING DOWN AT VORTEX GENERATOR

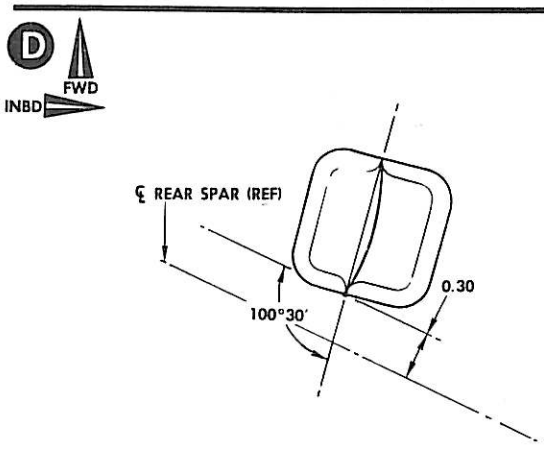



VIEW LOOKING UP AT VORTEX GENERATOR




VIEW LOOKING DOWN AT VORTEX GENERATOR

30 02 55 007A




VIEW LOOKING UP AT VORTEX GENERATOR

(5) Place vortex generator in correct position on horizontal stabilizer; applying enough pressure (approximately one pound psi) to ensure maximum adhesion. Remove excess EC 1291 from edges of part, with cloth dampened with MEK.

(6) Apply tape, JAN-P-127, Type 1, or equivalent, around vortex generator to hold in place during cure cycle.

(7) Allow EC 1291 to cure as directed on manufacturer's kit.

(8) Remove tape applied in paragraph (6) above.

(9) Refinish, as required, in accordance with procedures in Chapter 51, STRUCTURES - GENERAL.

# HORIZONTAL STABILIZER SEALS - DESCRIPTION AND OPERATION

## 1. General

The seals are installed at the inboard ends of the horizontal stabilizer assemblies and provide aerodynamic sealing at the fuselage area. The seals consist of a plain weave dacron fabric seal, impregnated with silicone rubber, and a silicone rubber base material seal, dacron wrapped and bonded.

## HORIZONTAL STABILIZER SEALS - REMOVAL/INSTALLATION

1. Removal/Installation - Horizontal Stabilizer Seals at Fuselage Station 1568.00 (see Figure 401)

A. General.

The following procedure is applicable to the plain weave dacron fabric seal impregnated with silicone rubber.

B. Equipment Required - Suitable work stand.

C. Remove Seals.

(1) Place suitable work stand in position to gain access to upper and lower surface of horizontal stabilizer.

NOTE: To gain access to seal attachment screws, the stabilizer leading edge must be brought to the full up position to remove the lower screws, and to the full down position to remove the upper screws.

(2) For stabilizer operation, proceed as follows:

(a) Connect external source of electrical power as directed in Chapter 24, ELECTRICAL POWER.

(b) Close and attach warning tag to the STAB. TRIM CONT. EMER. circuit breaker on the circuit breaker panel.

(c) Actuate STAB. TRIM SEL. switch to ELEC. STBY. position.

(d) Actuate ELEC. STBY. STAB. CONT. switch to NOSE UP or NOSE DN. position.

(3) Remove screws attaching seals to retainers inside fuselage.

NOTE: Bag and tag all loose parts for ease of reinstallation.

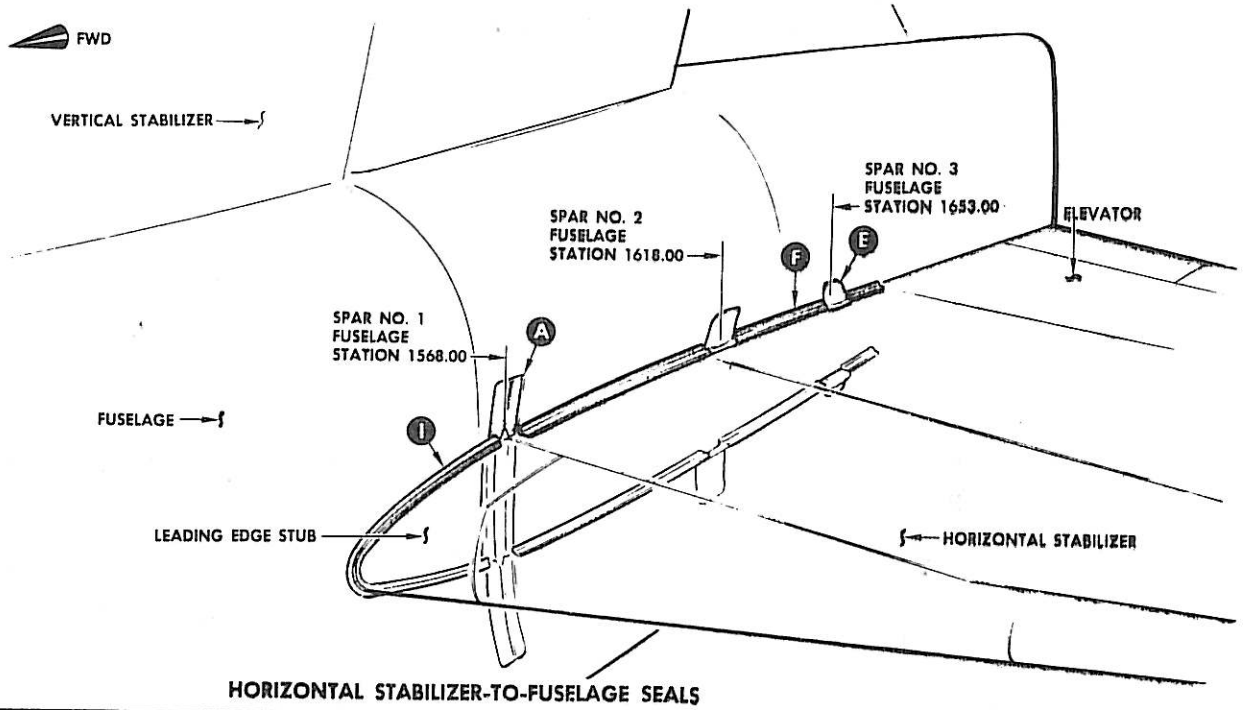
(4) Remove seals from fuselage, and remove phenolic spacers inside seals at screw holes.

D. Install Seals.

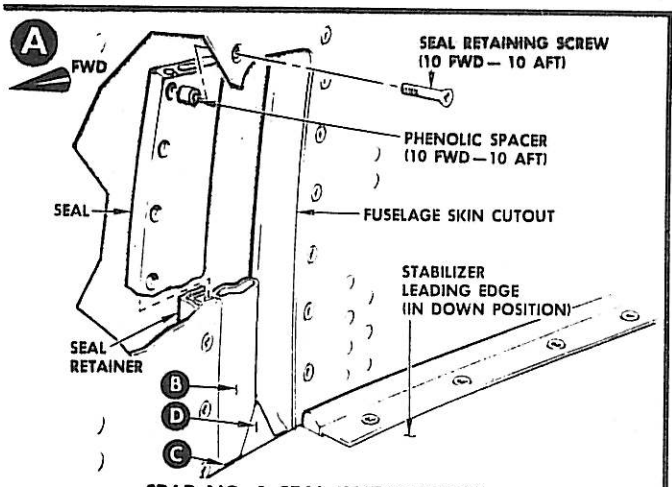
(1) To gain access to seal attachment screws, place the stabilizer in either the full up or down position as directed in step C.(2).

(2) Drill 0.312-inch holes in seals to match existing holes in fuselage seal retainers, and insert phenolic spacers in screw holes.

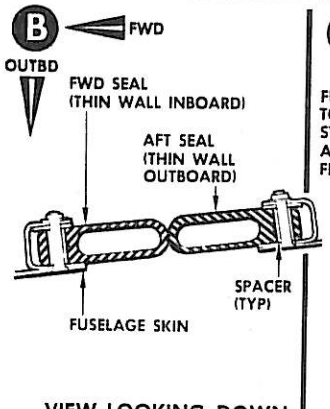
(3) Install forward seal with thin wall of seal facing inboard.



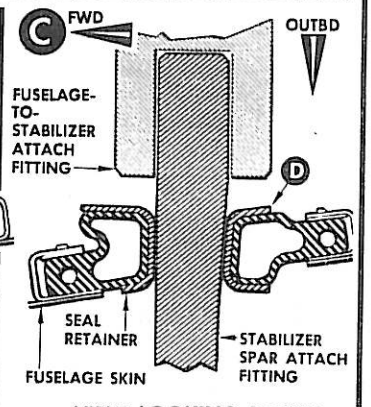

HORIZONTAL STABILIZER-TO-FUSELAGE SEALS




SPAR NO. 1 SEAL INSTALLATION

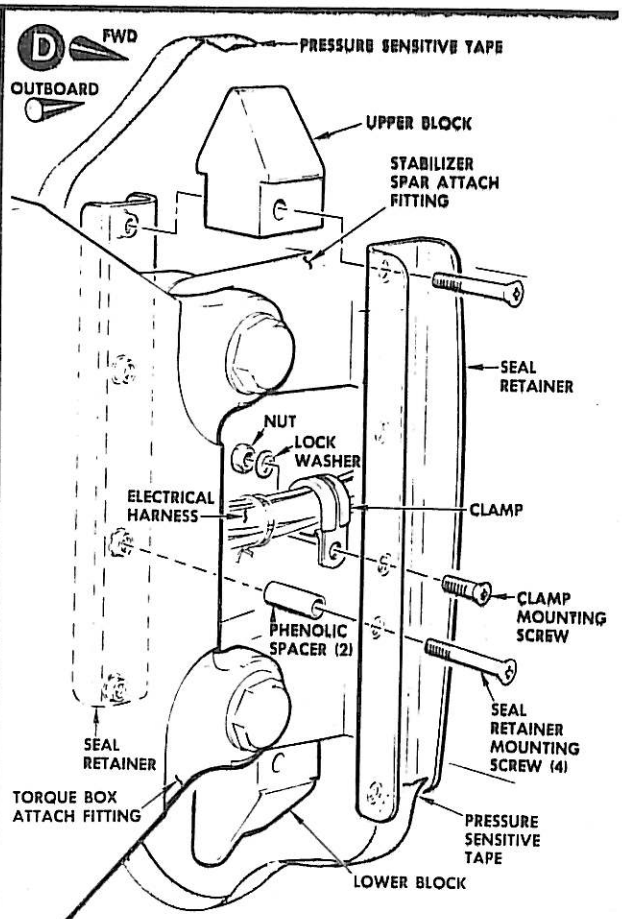



VIEW LOOKING DOWN

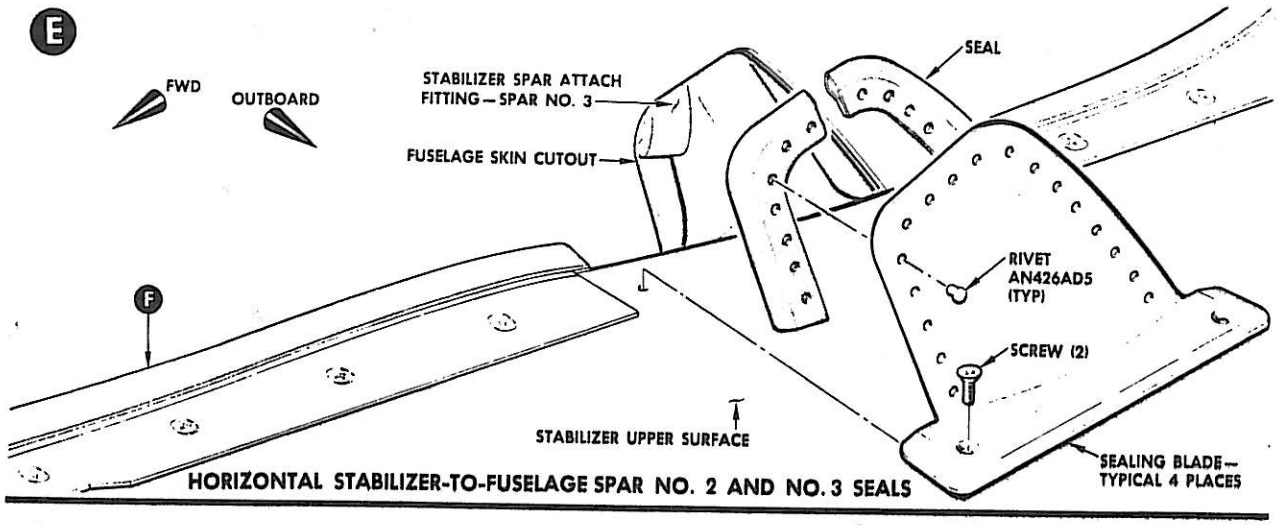



VIEW LOOKING DOWN

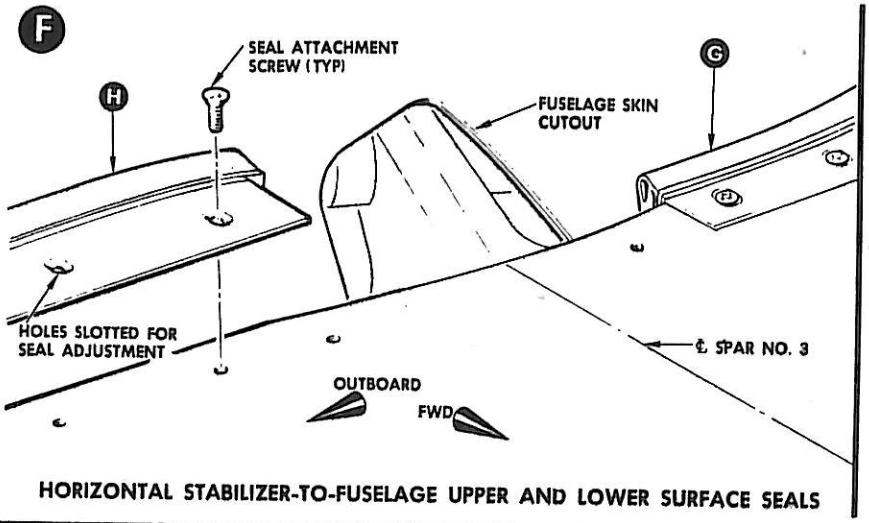
30.02.55.016.1



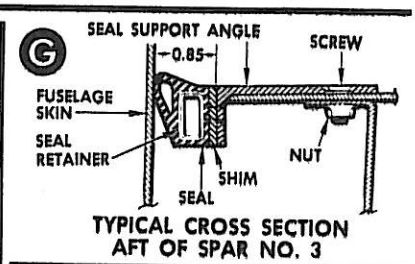

SEAL RETAINER INSTALLATION — FUSELAGE STATION 1568.00



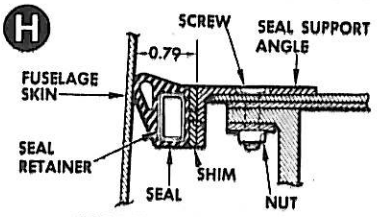

HORIZONTAL STABILIZER-TO-FUSELAGE SPAR NO. 2 AND NO. 3 SEALS



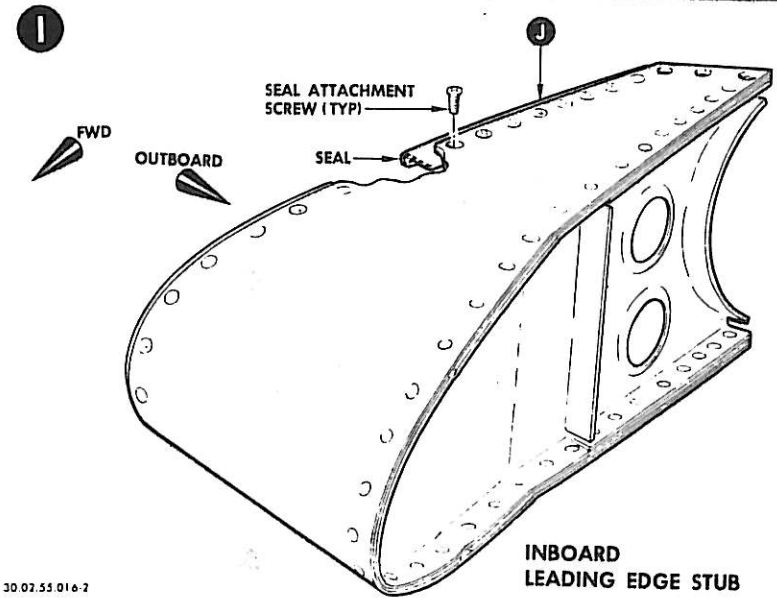

HORIZONTAL STABILIZER-TO-FUSELAGE UPPER AND LOWER SURFACE SEALS




TYPICAL CROSS SECTION AFT OF SPAR NO. 3

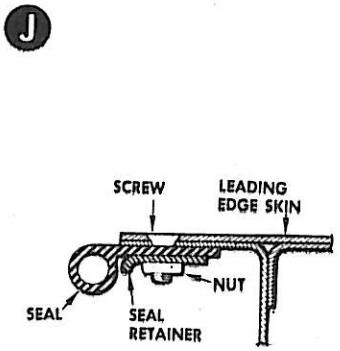



TYPICAL CROSS SECTION FWD OF SPAR NO. 3




INBOARD LEADING EDGE STUB

30.02.55.016-2




TYPICAL CROSS SECTION

(4) Install aft seal with thin wall of seal facing outboard.

(5) Remove external source of electrical power as directed in Chapter 24, ELECTRICAL POWER.

(6) Remove work stand from area.

2. Removal/Installation - Horizontal Stabilizer Upper and Lower Sealing Blades at Fuselage Stations 1618.00 and 1653.00 (see Figure 401)

A. General.

Removal/Installation procedure for the sealing blades is identical except for size of the attachment screws.

B. Equipment Required - Suitable work stand.

C. Remove Sealing Blade.

(1) Place suitable work stand in position to gain access to the upper and lower surface of the horizontal stabilizer.

(2) Remove two screws attaching sealing blade to horizontal stabilizer inboard rib; remove sealing blade.

(3) Remove rivets attaching seal to sealing blade, remove seal.

D. Install Sealing Blade.

(1) Drill holes in seal to match existing holes in sealing blade.

(2) Install rivets in seal and sealing blade as shown in Figure 401.

(3) Install sealing blade to horizontal stabilizer inboard rib, using two screws.

NOTE: Sealing blade must be located so that seal bears against fuselage at all points.

(4) Remove work stand from area.

3. Removal/Installation - Horizontal Stabilizer to Fuselage Upper and Lower Surface Seals (see Figure 401)

A. General.

The following procedure is applicable to the plain weave dacron fabric seal impregnated with silicone rubber.

B. Equipment Required - Suitable work stand.

C. Remove Seals.

(1) Place suitable work stand in position to gain access to the upper and lower surface of the horizontal stabilizer.

(2) Remove screws attaching seal support angle to stabilizer inboard rib.

NOTE: Bag and tag all loose parts for ease of reinstallation.

(3) Remove seal support angle and seal assembly from stabilizer.

(4) Remove screws attaching shim, seal retainer, and seal to support angle.

(5) Remove seal retainer from inside seal.

D. Install Seals.

(1) Drill 0.257-inch holes in new seal to match existing holes in seal retainer.

NOTE: Seal to be located so that end of seal is against spar seal.

(2) Insert seal retainer inside seal, and install shim, seal retainer, and seal to seal support angle.

(3) Install seal support angle and seal assembly to stabilizer inboard rib.

(4) Maintain dimensions between seal support angle and fuselage as shown in Figure 401.

(5) Remove work stand from area.

4. Removal/Installation - Horizontal Stabilizer Inboard Leading Edge Stub Seal (see Figure 401)

A. The following procedure is applicable to the silicone rubber base material seal, dacron wrapped and bonded.

B. Equipment Required - Suitable work stand.

C. Remove Seal.

(1) Place suitable work stand in position to gain access to the upper and lower surface of the horizontal stabilizer.

(2) Remove inboard leading edge stub section as directed in 55-1-3 Removal/Installation - Horizontal Stabilizer Leading Edge.

(3) Remove screws attaching seal and seal retainer to inboard end of leading edge stub.

NOTE: Bag and tag all loose parts for ease of reinstallation.

(4) Remove seal and seal retainer from leading edge stub.

D. Install Seal.

(1) Install seal and seal retainer in leading edge stub.

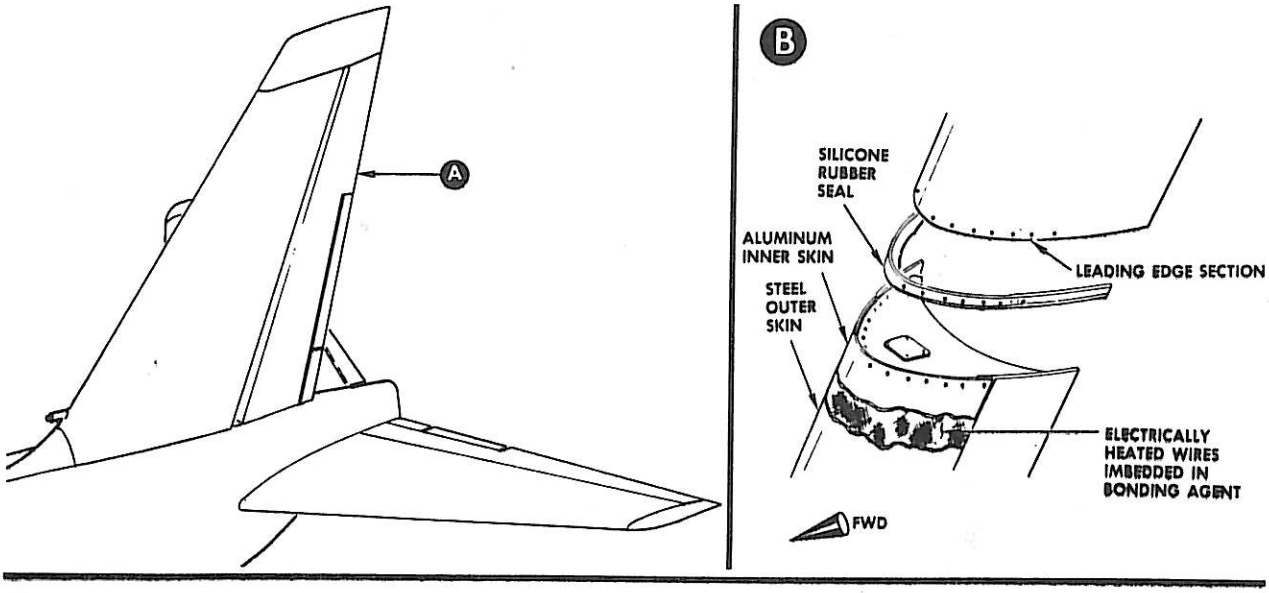
(2) Install inboard leading edge stub section as directed in 55-1-3 Removal/Installation - Horizontal Stabilizer Leading Edge.

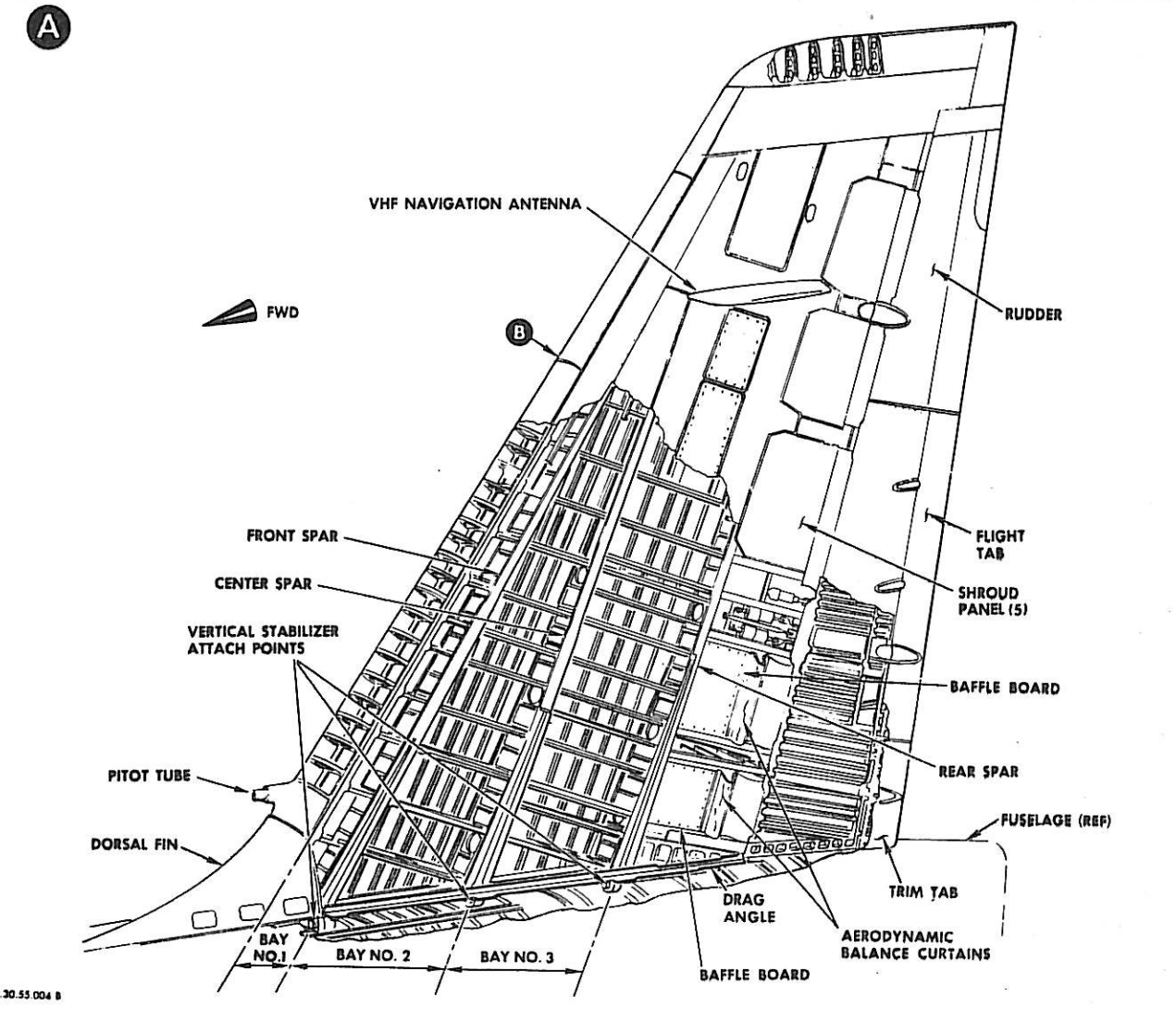
# VERTICAL STABILIZER - DESCRIPTION AND OPERATION

## 1. General

The vertical stabilizer (see Figure 1) extends approximately 20 feet above the fuselage. It consists of an interspar box-beam assembly, an electrically de-iced leading edge assembly, trailing edge shroud panels, a tip assembly, a power-controlled rudder, and a dorsal fin at the fuselage joining area. The vertical stabilizer is replaceable as a unit. The assembly attaches to the fuselage at six points, three on each side of the airplane centerline, through fittings at the lower end of each stabilizer main spar. Fuselage bulkhead fittings, located at stations 1439, 1488 and 1526, align with the stabilizer spar fittings for installation of shear-type bolts.

Stressed access panels are installed on the left side of the stabilizer to provide access to the interior of the assembly. Drag angles are riveted and bolted to each side of the vertical stabilizer and to the fuselage to form closing strips between the stabilizer and fuselage. The drag angles transmit skin loads from the vertical stabilizer into the fuselage.






Vertical Stabilizer
Figure 1

## VERTICAL STABILIZER - MAINTENANCE PRACTICES

1. Removal/Installation Vertical Stabilizer (see Figure 401)

A. General.

The vertical stabilizer can be removed and installed without removing the rudder. For removal/installation of rudder, refer to Chapter 27, FLIGHT CONTROL.

B. Equipment Required.

(1) Load bar and hoisting yokes, or an equivalent lifting unit for handling vertical stabilizer.

(2) (48) AN3-6A bolts to attach hoisting yokes to vertical stabilizer.

(3) (48) AN960-10 washers to install under head of AN3-6A bolts.

(4) Hoist with 5 ton lifting capacity.

(5) Work stands suitable to gain access to all areas of rear fuselage and vertical stabilizer.

(6) Torque wrench.

(7) A 1 7/16-inch crowsfoot for use with torque wrench.

(8) Plastic scraper for removing old sealant.

(9) Clean, lint-free cloths.

(10) Aliphatic naphtha, Federal Specification TT-N-95a.

(11) Corrosion preventive, Specification MIL-C-16173, Grade 3.

(12) Petrolatum, Federal Specification VV P-236.

(13) Sealant EC1291, 3M Co., St. Paul 6, Minn. or equivalent.

C. Preparation.

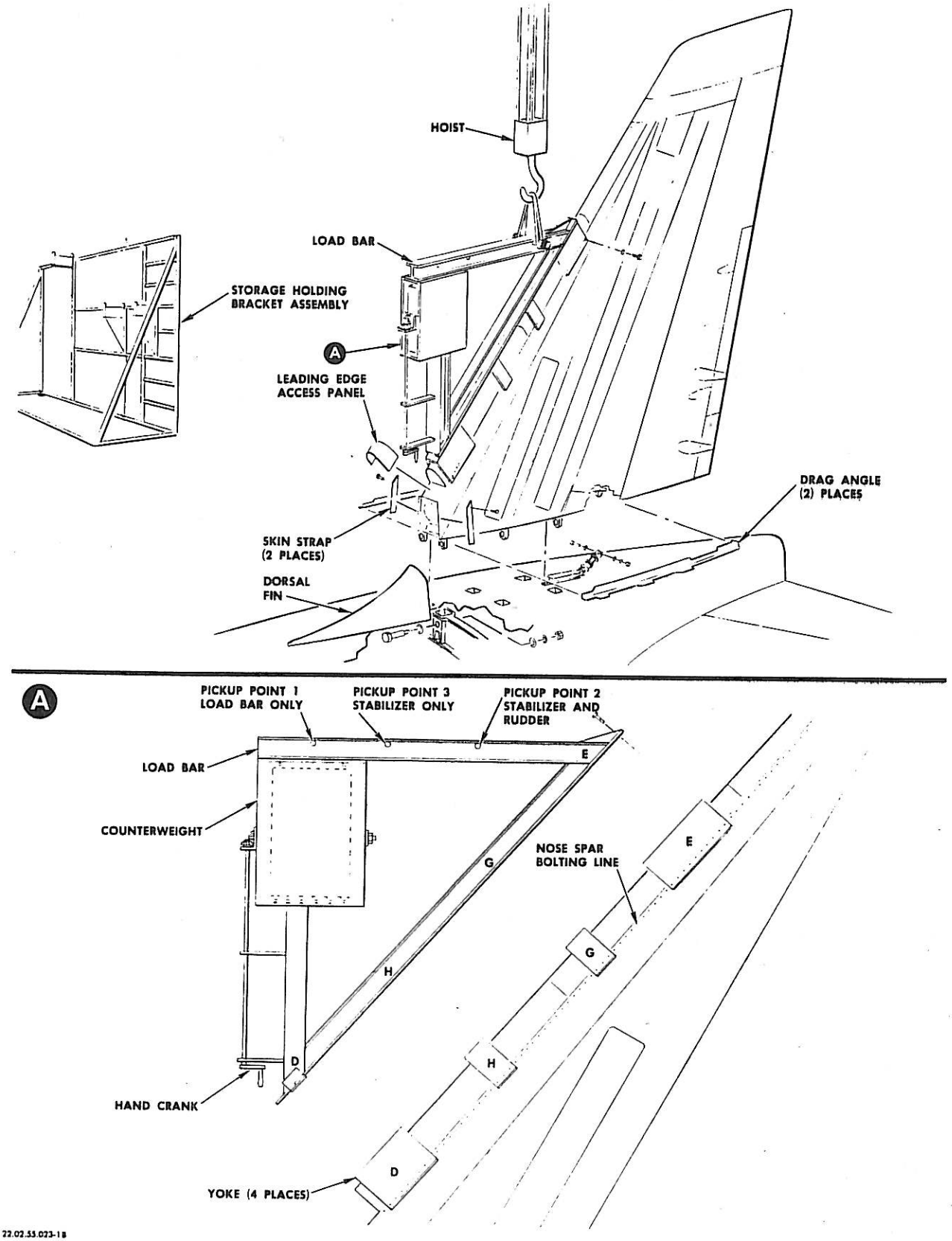
(1) Park and moor airplane as directed in Chapter 10, PARKING AND MOORING.

(2) Open and attach warning tags to circuit breakers as listed in:

(a) Chapter 23, COMMUNICATIONS

(b) Chapter 24, ELECTRICAL POWER

(c) Chapter 27, FLIGHT CONTROL






Vertical Stabilizer Hoisting Fixture
Figure 401

(d) Chapter 30, ICE AND RAIN PROTECTION

(e) Chapter 34, NAVIGATION

(3) Remove three TAIL DE-ICE limiters from power distribution box, located on right-hand side of fuselage in flight compartment below flight engineers table.

(4) Open aft fuselage access door; refer to Chapter 12, SERVICING.

(5) Remove access doors and panels, as required, to gain access to vertical stabilizer and drag angle attach bolts; refer to Chapter 12, SERVICING, for door and panel locations.

NOTE: Bag and tag all loose hardware for ease of reinstallation.

(6) Remove skin straps from each side of vertical stabilizer at aft end of dorsal fin.

(7) To gain access to vertical stabilizer attach bolts and drag angle fasteners in rear fuselage area, remove items listed below as directed in Chapter 25, EQUIPMENT/FURNISHINGS.

(a) Aft lavatory OCCUPIED-VACANT signs above lavatory doors, fuselage station 1438.

(b) "V" shaped overhead trim panel forward of aft lavatory doors.

(c) Open access doors in overhead trim panels above lavatory mirrors.

(d) Forward overhead trim panels in lavatory areas.

(e) Rear entrance area overhead paneling, as required.

(f) Remove soundproofing in overhead, as required.

CAUTION: PROTECT EQUIPMENT AND FURNISHINGS REMAINING IN REAR ENTRANCE AND LAVATORY AREAS FROM DIRT, MOISTURE, AND OTHER DAMAGE DURING REMOVAL AND INSTALLATION OF VERTICAL STABILIZER.

(8) Install load bar, or equivalent lifting bar, and four yokes on vertical stabilizer leading edge as follows (see Figure 401);

(a) Remove four yokes from load bar and retain attaching bolts for installation.

(b) Space four yokes over vertical stabilizer leading edge and mark attaching bolt locations from template holes.

(c) Remove four yokes in order to remove screws at marked locations.

(d) Reinstall four yokes with template holes aligned over marked locations. Fasten yokes at nose spar bolting line, using (48) AN3-6A bolts with AN960-10 washers under bolt heads.

(e) Raise load bar from storage holding bracket assembly by inserting hoist hook at pick-up point 1. Move load bar clear of bracket assembly and balance as required by positioning counterweight with hand crank.

(f) Carefully position load bar over four yokes installed in paragraph (d) above. Secure load bar to four yokes with attaching bolts retained in paragraph (a) above.

(g) With load bar securely bolted to four yokes, remove hoist hook from pick-up point 1 and insert at pick-up point 2.

(h) Operate hoist sufficiently to support weight of vertical stabilizer.

NOTE: If rudder has been removed, use pick-up point 3 on load bar for supporting vertical stabilizer only.

D. Remove Vertical Stabilizer.

(1) Disconnect rudder autopilot cable as directed in Chapter 27, FLIGHT CONTROL.

(2) Disconnect rudder control cables as directed in Chapter 27, FLIGHT CONTROL; refer to Figure 402 in this section.

(3) Disconnect VHF navigation coaxial cables at vertical stabilizer disconnect fitting as directed in Chapter 34, NAVIGATION.

(4) For airplanes equipped with HF communications system, disconnect coaxial cables at vertical stabilizer disconnect and at pressure bulkhead disconnect fittings as directed in Chapter 23, COMMUNICATIONS.

(5) Remove clamps as required from coaxial cables to permit stowing cables during removal and installation of vertical stabilizer.

(6) Remove clamps, as required, adjacent to de-icing system wire harness permanent splice area.

(7) Disconnect de-icing harness wires at permanent splice area and tag for installation as directed in Wiring Diagram Manual, Chapter 30, ICE AND RAIN PROTECTION.

(8) Remove clamps as required adjacent to radio system wire harness permanent splice area.

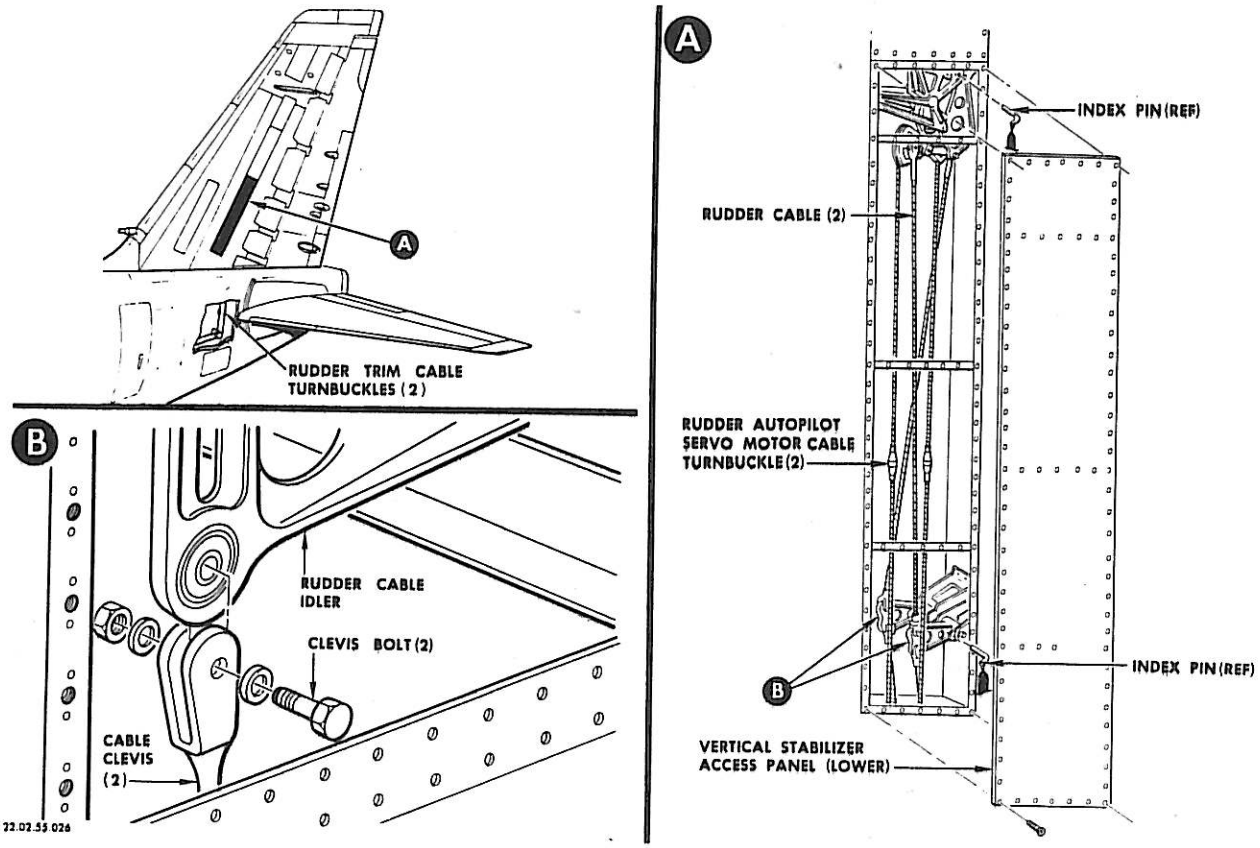

A
RUDDER TRIM CABLE TURNBUCKLES (2)
B
RUDDER CABLE IDLER
CLEVIS BOLT (2)
CABLE CLEVIS (2)
22.02.55.026
A
INDEX PIN (REF)
RUDDER CABLE (2)
RUDDER AUTOPILOT SERVO MOTOR CABLE TURNBUCKLE (2)
INDEX PIN (REF)
B
VERTICAL STABILIZER ACCESS PANEL (LOWER)

Figure Detail

(9) Disconnect radio harness wires at permanent splice area and tag for installation as directed in Wiring Diagram Manual, Chapter 23, COMMUNICATIONS.

(10) Remove and retain drag angles from vertical stabilizer-to-fuselage area on each side by carefully removing fasteners as directed in 990 Structural Repair Manual.

(11) Make certain all disconnected wires and cables are secured clear of attaching area before attempting to separate vertical stabilizer attach fittings.

(12) Reinstall interspar access doors in vertical stabilizer.

CAUTION: ALL INTERSPAR ACCESS DOORS MUST BE INSTALLED AND SECURED WITH ALL FASTENERS BEFORE LIFTING VERTICAL STABILIZER.

(13) Remove nuts and washers from large bolts (refer to Figure 403) at rear of vertical stabilizer attach fittings; fuselage stations 1439, 1488, and 1526. Do not remove bolts at this time. — A & B

(14) Remove panel in lower section of shroud, fuselage station 1545, to disconnect link from vertical stabilizer structure as follows:

(a) Remove bolt from rear end of connecting link and fitting on vertical stabilizer structure. — C

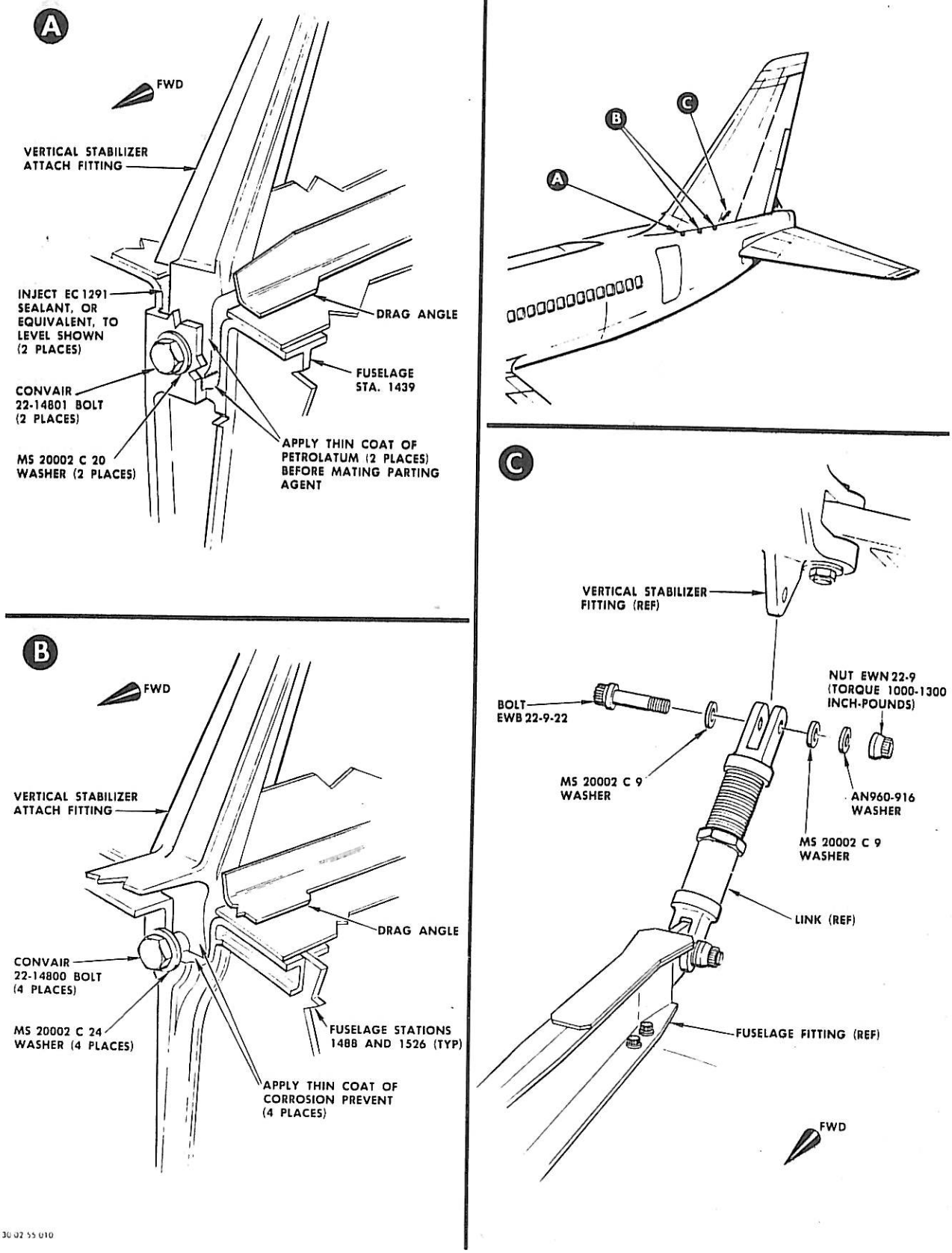
(b) Leave connecting link attached to fitting on fuselage structure for installation.

(15) With hoist supporting vertical stabilizer, remove six large bolts from attach fittings. (Bag and tag bolts with nuts and washers removed in step (13). — A & B

(16) Carefully lift vertical stabilizer clear of fuselage and place on an approved storage fixture.

CAUTION: MAINTAIN SUFFICIENT CLEARANCE BETWEEN VERTICAL STABILIZER LEADING EDGE AND DORSAL FIN STRUCTURE AT FUSELAGE STATION 1439 WHEN SEPARATING ATTACH FITTINGS.

(17) Reinstall panel removed in step (14).




30 02 55 010

Vertical Stabilizer to Fuselage Bolt Installation
Figure 403

Figure
Detail

(18) Using a clean cloth dampened with aliphatic naphtha and a plastic scraper, remove old sealant from areas of vertical stabilizer-to-fuselage attachment; refer to Figure 403. Be sure to remove all of old sealant from sockets of attach fittings in fuselage.

CAUTION: DO NOT PERMIT ALIPHATIC NAPHTHA TO PENETRATE BETWEEN SURFACES OF FRAMES, SKINS, AND ATTACH FITTINGS. DO NOT ALLOW CONTACT WITH INSULATION BLANKETS OR FURNISHINGS IN FUSELAGE.

E. Install Vertical Stabilizer.

(1) Prepare airplane and vertical stabilizer for installation in accordance with paragraph C above.

(2) To facilitate replacement of vertical stabilizer, mark drilling reference lines on skin sheets before joining to fuselage. These lines will assist in establishing sufficient edge distance when drilling holes in blind areas to install drag angles.

(a) Using a straight edge and pencil, mark a horizontal line parallel to root rib in bay 2 of vertical stabilizer base.

(b) Mark two vertical lines from the base reference line, drawn in step (a) above, to indicate end limits of root rib.

(c) Mark a horizontal line, between vertical lines drawn in step (b), three inches above and parallel to base reference line drawn in step (a).

(d) Follow procedures in steps (a) through (c) and mark drilling reference lines parallel to root rib in bay 3 of vertical stabilizer base.

NOTE: Top reference lines will show above edge of drag angles when positioned for drilling.

(e) Mark single reference lines for drilling holes in drag angles and vertical stabilizer between fuselage stations 1430 and 1439; also between fuselage stations 1531 and 1561 on left side.

(3) Apply a thin coat of corrosion preventive, on lugs and inside socket surfaces of vertical stabilizer attach fittings at fuselage stations 1488 and 1526; refer to Figure 403.

(a) Attach drag angles to fuselage at several existing hole locations with Cleco clamps.

(b) Using reference lines marked in step (2) to determine adequate edge distance of holes, carefully drill through vertical stabilizer for installing fasteners.

(c) Remove drag angles and prepare vertical stabilizer-to-fuselage area, from station 1430 to 1488, for pressure sealing as directed in Chapter 51, STRUCTURES - GENERAL.

(d) Install drag angles, with fasteners shown in Figure 404, in accordance with standard procedures of the 990 Structural Repair Manual.

(e) Touch up drag angles and fasteners with epoxy primer and with gloss gray epoxy top coat as directed in Chapter 51, STRUCTURES - GENERAL.

(14) Remove load bar, or equivalent lifting bar, and four yokes from vertical stabilizer leading edge (see Figure 401).

(a) Lower hoist and remove hook from pickup point 2. Insert hoist hook at pickup point 1 on load bar.

(b) Operate hoist sufficiently to support weight of load bar.

(c) Remove and retain large bolts securing load bar to four yokes on leading edge of vertical stabilizer.

(d) Raise load bar to clear airplane and place on storage holding bracket assembly. Remove hoist hook from pickup point.

(e) Remove bolts attaching four yokes to leading edge of vertical stabilizer (Bag and tag bolts and washers for future installation).

(f) Install four yokes on load bar with bolts retained in step (c) above.

(15) Reinstall screws along nose spar bolting line at locations where AN3-6A bolts were removed (see Figure 401).

(16) Install skin straps on both sides of vertical stabilizer at aft end of dorsal fin with screws retained in paragraph C (6).

(17) Connect wires and cables in empennage area as follows:

(a) Connect radio harness wires at permanent splice area as directed in Wiring Diagram Manual, Chapter 23, COMMUNICATIONS, for circuits. Refer to NOTES for permanent splicing procedure.

(b) Install clamps, removed in paragraph D (8), to secure radio harness adjacent to permanent splice area.

(c) Connect de-icing harness wires at permanent splice area as directed in Wiring Diagram Manual, Chapter 30, ICE AND RAIN PROTECTION, for circuits. Refer to NOTES for permanent splicing procedure.

(d) Install clamps, removed in paragraph D (6), to secure de-icing harness adjacent to permanent splice area.

(e) For airplanes equipped with HF communications system, connect coaxial cables at vertical stabilizer disconnect and at pressure bulkhead disconnect fittings as directed in Chapter 23, COMMUNICATIONS.

(f) Connect VHF navigation coaxial cables at vertical stabilizer disconnect fittings as directed in Chapter 34, NAVIGATION.

(g) Install clamps, removed in step (5), to secure coaxial cables in empennage area.

(h) Connect rudder control cables at fuselage station 1526 as directed in Chapter 27, FLIGHT CONTROL.

(i) Connect rudder autopilot cable as directed in Chapter 27, FLIGHT CONTROL.

(j) Accomplish adjustment/test of rudder control system as directed in Chapter 27, FLIGHT CONTROL.

(18) Install access doors and panels removed to gain access to vertical stabilizer and drag angle attach bolts; refer to Chapter 12, SERVICING, for door and panel locations.

(19) Check for leaks around fastener holes in cabin pressurized area at drag angles as directed in Chapter 53, FUSELAGE.

F. Restore Condition of Airplane.

(1) Install items removed in paragraph C (7), to gain access to vertical stabilizer attach bolts and drag angle fasteners in rear fuselage area as directed in Chapter 25, EQUIPMENT/FURNISHINGS.

(2) Close and remove warning tags from circuit breakers as listed in:

(a) Chapter 23, COMMUNICATIONS

(b) Chapter 24, ELECTRICAL POWER

(c) Chapter 27, FLIGHT CONTROL

(d) Chapter 30, ICE AND RAIN PROTECTION

(e) Chapter 34, NAVIGATION

(3) Install three TAIL DE-ICE limiters in power distribution box, located on right hand side of fuselage in flight compartment below flight engineers table.

(4) Close aft fuselage access door as directed in Chapter 12, SERVICING.

(5) Clear work stands from airplane area.

(6) Accomplish adjustment/test as follows:

| SYSTEM | CHAPTER REFERENCE |
|---|---|
| VHF Navigation | 34, NAVIGATION |
| HF Communication (For airplanes equipped) | 23, COMMUNICATION |
| Anti-icing | 30, ICE AND RAIN PROTECTION |
| Autopilot | 22, AUTOPILOT |
| Rudder Control | 27, FLIGHT CONTROL |
| Cabin Pressure | 21, AIR CONDITIONING |
| Aft Lavatory Warning Sign | 25, EQUIPMENT/FURNISHINGS |

## VERTICAL STABILIZER - INSPECTION/CHECK

1. Inspection/Check Vertical Stabilizer

A. Access.

(1) Remove access panels on left side of interspar assembly.

(2) Open trailing edge shroud panels and balance board mechanism access doors.

(3) Remove access panels in right side of rudder.

(4) Remove flight tab and trim tab hinge fairing plates and control rod fairings on left side.

B. Check the Following:

(1) Stabilizer skins for cracks, corrosion, loose fasteners, and general condition.

(2) Dorsal fin installation, including stabilizer-to-fuselage drag angles for general condition, cracks, corrosion, and loose fasteners.

(3) Leading edge for cracks, corrosion, loose fasteners, and general condition. Check stainless steel skins and de-icing blankets for delamination.

(4) Tip assembly for cracks, corrosion, loose fasteners, and general condition.

(5) Balance boards, restrictors, and seals for condition and security.

(6) Interspar assembly spars, stringers, ribs, and intercostals for deformation, cracks, corrosion, and loose fasteners.

(7) Stabilizer attach fittings and hardware for condition and security.

(8) Rudder, flight tab, and trim tab structure for cracks, corrosion, and loose fasteners.

(9) Rudder and tab hinge fittings and supports for condition. Check hinge bearings for freedom of rotation and hinge bolts for security.

(10) Rudder, balance board, and tab actuating systems for general condition, freedom of movement, and security.

(11) VHF blade-type antennas for condition and security.

# VERTICAL STABILIZER INTERSPAR ASSEMBLY - DESCRIPTION AND OPERATION

## 1. Description

The interspar assembly is the primary structural component of the vertical stabilizer. It consists of three main spars, ribs, and spanwise plate-stringer skin panels. In addition, an auxiliary spar is used at the leading edge attachment to the interspar assembly. Large plate-type access panels on the left side of the interspar assembly provide for access to interior areas and are part of the stress structure.

A door, of aluminum honeycomb sandwich construction, is hinged to the upper left side of the interspar assembly. A fin-type VHF navigation antenna is mounted on a bracket riveted directly below the door. A second antenna assembly of the same construction is mounted on the opposite side of the vertical stabilizer interspar assembly.

Mounting brackets for the components of the rudder feel system and for the hydraulically-powered rudder control are located within the interspar assembly. Static ports in the skin of the stabilizer, just above rib. No. 10, exhaust air from the "Q"-box assembly of the rudder feel system.

## 2. Structure

The vertical stabilizer interspar assembly is of box-beam construction utilizing built-up spars, ribs, and plate-stringer skin panels. The front and rear spars are located at the 12.6 and 50 percent chord line respectively. The center spar is parallel to and approximately 35 inches forward of the rear spar. The main spars are built up of 7075 aluminum alloy rails and webs. The front and rear spars extend through the full span of the interspar assembly, but the center spar reduces to stringers in the upper portion of the assembly. Lug-type 7079 forged aluminum alloy fittings are spliced into the lower ends of the spar rails to transfer stabilizer loads into the fuselage. The vertical stabilizer fittings align with the socket-type fuselage fittings and are secured by cadmium-plated, steel bolts. The auxiliary spar, located in front of the main front spar, consists of extruded tee rails of 2024 aluminum alloy, joined by cross-bracing without lug fittings for attachment. The auxiliary spar supports the leading edge sections and the skin panels forward of the main spar.

Extruded 7075 aluminum alloy zee stringers also support the stabilizer skin panels. Skin panel doublers are installed adjacent to the lower end of the spar assemblies to reduce shear stresses resulting from the transfer of skin loads into the stabilizer fittings.

Truss-type ribs transfer airloads into the interspar assembly and counteract loads developed by bending curvature; web-type ribs transfer the rudder hinge loads into the interspar assembly. A web-type rib closes the interspar assembly at the lower end. The interspar assembly skin panels are primarily of 7075 aluminum alloy reinforced with zee stringers.

Drag angles of 7075 aluminum alloy assist in transferring stabilizer torsion loads into the fuselage at the joining area.

# VERTICAL STABILIZER LEADING EDGE - DESCRIPTION AND OPERATION

## 1. Description

The vertical stabilizer leading edge assembly consists of three large main sections and a short lower stub section. Each leading edge section is secured to the auxiliary front spar with flush-head screws. Except for the lower stub section, silicon rubber seals are installed at the butt joints between the leading edge sections to provide aerodynamic sealing. De-icing blankets, heated electrically, are bonded to all leading edge sections.

## 2. Structure

Construction of the vertical stabilizer leading edge sections is similar to that of the horizontal stabilizer leading edges. Except for the lower stub section, the vertical stabilizer leading edges are built-up with 2024 aluminum alloy ribs covered by 2024 aluminum alloy skin. The skins are flush-riveted to the ribs and are inside of the normal leading edge contour. The de-icing blankets, bonded to the outside of the aluminum skins, bring the leading edges out to contour. The exposed skin on the exterior surface of the de-icing blankets is of stainless steel foil. The leading edge sections are reinforced by an extruded doubler strap along the attaching area. The leading edge lower stub section is a welded tube and curved doubler assembly which supports the pitot tube for the rudder control system.

## VERTICAL STABILIZER LEADING EDGE - MAINTENANCE PRACTICES

1. Removal/Installation Vertical Stabilizer Leading Edge (see Figure 201)

A. General.

The vertical stabilizer leading edge is divided into three large main sections and a short lower stub section. Except for the lower main section, any one of the leading edge sections can be removed without removing the other sections. In addition to disconnecting de-icing harness wires at the permanent splice area, it is necessary to disconnect the pitot tube hose and clamps from the air duct behind the lower stub section.

B. Equipment Required - None.

C. Remove Vertical Stabilizer Leading Edge.

(1) Open and attach warning tags to circuit breakers as listed in:

(a) Chapter 23, COMMUNICATIONS

(b) Chapter 24, ELECTRICAL POWER

(c) Chapter 30, ICE AND RAIN PROTECTION

(d) Chapter 34, NAVIGATION

WARNING: DO NOT ENERGIZE ANY COMMUNICATIONS SYSTEMS WHILE PERSONNEL ARE WORKING NEAR ANTENNA AREAS ON VERTICAL STABILIZER.

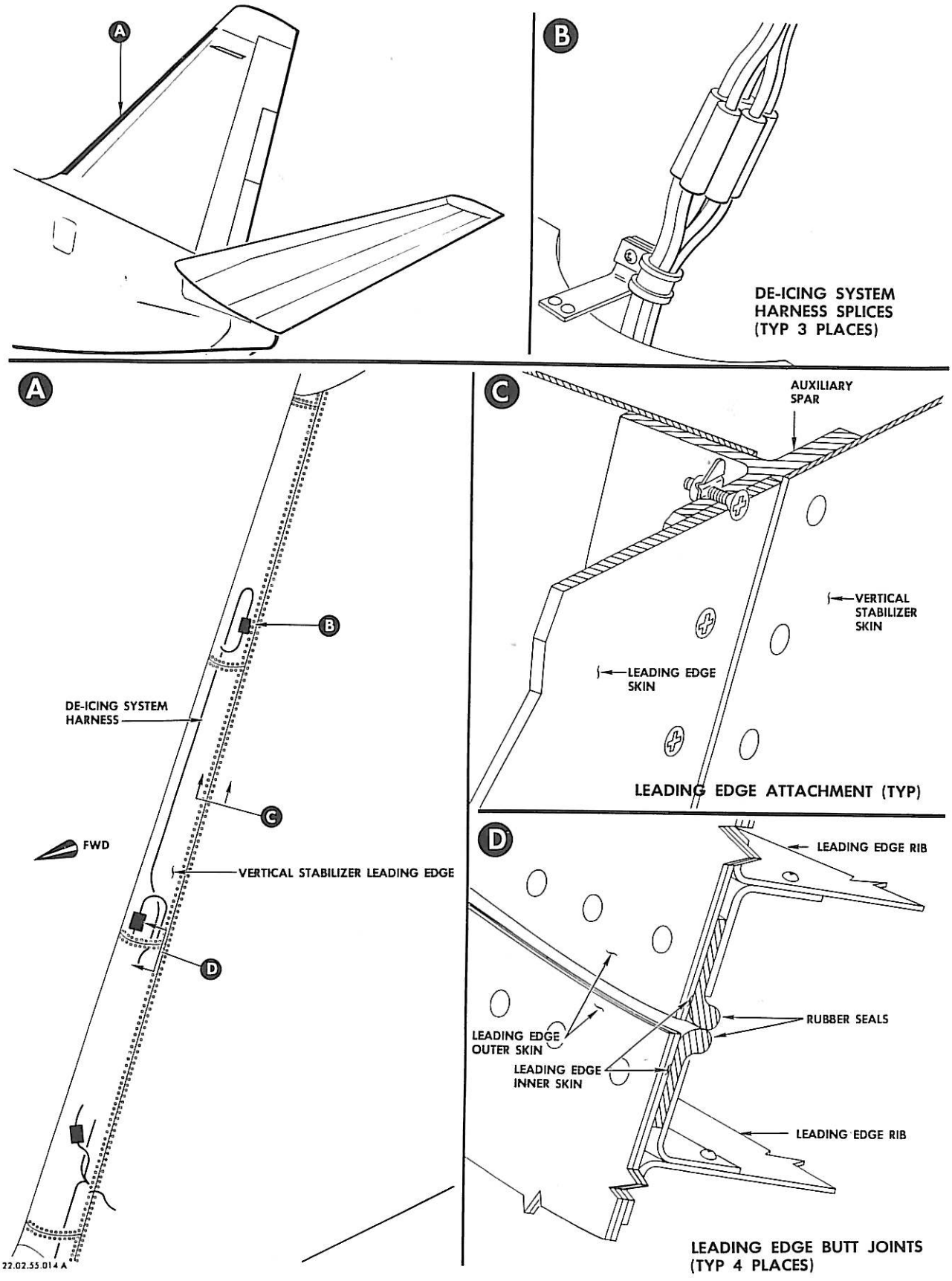
(2) Position two maintenance stands of sufficient height to gain access to top of vertical stabilizer.

NOTE: Bag and tag all loose parts for ease of reinstallation.

(3) Remove interspar access door, 159, from left side of vertical stabilizer.

(4) Remove skin straps from either side of vertical stabilizer at fuselage station 1439.

NOTE: When removing lower main leading edge section, it is necessary to first loosen hose clamps and slide hose aft from ends of air ducts behind lower stub section; then remove screws securing both sides of stub section, and slip from stabilizer.






Vertical Stabilizer Leading Edge Installation
Figure 201

(5) Remove screws securing both sides of leading edge section to auxiliary spar.

CAUTION: SUPPORT LEADING EDGE SECTION BEFORE REMOVING ALL SCREWS TO PREVENT IT FROM FALLING AND DAMAGING DE-ICING SYSTEM COMPONENTS.

(6) Slip leading edge section from stabilizer and carefully rotate enough to gain access to de-icing wire harness and clamps.

(7) Remove clamps in area of permanent splice for de-icing wires in leading edge section being removed.

(8) Disconnect wires at permanent splice and tag for installation.

(9) Lift leading edge section clear of vertical stabilizer and secure loose wires to rear of removed section.

D. Install Vertical Stabilizer Leading Edge.

(1) Check that circuit breakers on circuit breaker panels are open, as listed in paragraph C (1).

(2) Place two maintenance stands of sufficient height to gain access to top of vertical stabilizer.

NOTE: When installing lower main leading edge section, check that interspar access door, 159, is removed from left side of stabilizer. Also check that hose and clamps are loosely installed on aft air duct behind stub section.

(3) Cut ties stowing loose wires at rear of leading edge section and then support section adjacent to auxiliary spar of vertical stabilizer.

(4) Connect de-icing harness wires at permanent splice area as directed in Wiring Diagram Manual, Chapter 30, ICE AND RAIN PROTECTION, for circuits. Refer to NOTES for permanent splicing procedure. Remove wire identification tags.

(5) Install clamps to secure de-icing harness adjacent to permanent splice area.

(6) Place leading edge section in position, aligning screw holes with those in stabilizer auxiliary spar.

NOTE: When installing lower main leading edge section, make certain that ends of air ducts are aligned and connected by hose. Do not tighten hose clamps until stub section is secured to auxiliary spar and to lower main leading edge section.

(7) Install screws securing both sides of leading edge section to auxiliary spar of vertical stabilizer.

NOTE: When installing lower main leading edge section, secure lower edge to stub section with flush-head screws. Tighten clamps on hose connecting air ducts.

(8) Install skin strap on each side of vertical stabilizer at aft end of dorsal fin with flush-head screws.

(9) Install interspar access door, 159, on left side of vertical stabilizer.

(10) Close circuit breakers on circuit breaker panels; as listed in paragraph C (1), and remove warning tags.

(11) Perform anti-icing system Adjustment/Test procedure; as directed in Chapter 30, ICE AND RAIN PROTECTION.

(12) Clear maintenance stands from airplane area.

# VERTICAL STABILIZER TRAILING EDGE - DESCRIPTION AND OPERATION

## 1. Description

The area between the rear spar of the interspar assembly and the rudder hinge line comprises the vertical stabilizer trailing edge structure. The rudder hinge support ribs, forward portion of the rudder nose boxes, and the mechanisms for rudder and tab operation are housed within the trailing edge area.

There are five trailing edge shroud panels on each side of the vertical stabilizer, each secured on three sides. The forward edge is hinged to the interspar assembly rear spar and the upper and lower sides are attached to the rudder hinge support ribs with screws.

## 2. Structure

A pair of web-type ribs extend aft from the rear spar of the interspar assembly at each of the rudder hinge points. The two ribs at the rudder hinge No. 3 location are approximately 13 inches apart; the two support ribs at each of the remaining rudder hinge locations are approximately six inches apart. The mechanisms for operating the rudder, flight tab, and trim tab are accessible through doors which are attached to the ribs with countersunk-head screws. The larger areas between each pair of hinge support ribs are covered with 2024 aluminum alloy, honeycomb sandwich shroud panels.

# VERTICAL STABILIZER TIP - DESCRIPTION AND OPERATION

## 1. Description

The stabilizer tip structure consists of four subassemblies which comprise the upper 40 inches of the vertical stabilizer. The upper 30 inches of the tip structure is fabricated of aluminum alloy parts and the lower 10 inches is of fiberglas construction.

The forward and aft tip cap assemblies are made of formed and welded 5052 aluminum alloy skins flush-riveted to 2024 aluminum alloy frames and doublers. A tapered tip of fiberglas is secured to the trailing edge of the aft tip cap assembly by a flush-riveted attaching cap of 5052 aluminum alloy.

The tip box is built up of 7075 aluminum alloy skins flush-riveted to ribs, rails, and doublers of 2024 aluminum alloy. Another section of the tapered fiberglas tip is secured to the tip box trailing edge in the same manner as on the aft tip cap assembly.

The three aluminum alloy subassemblies are fastened together with flush-head screws.

The shield assembly is constructed of fiberglas components bonded together with epoxy resin. Skin panels of the shield are reinforced with angles, channels, and stiffeners of fiberglas. Two fiberglas spars are located in the assembly to align with the front and rear spars in the vertical stabilizer interspar assembly. The spars terminate in fiberglas lugs incorporating machine bushings for attachment. The leading edge cap area of the fiberglas skin is coated with a rain erosion preventive compound. The top edge of the shield assembly is secured to the lower edge of the tip box assembly with flush-head screws and rivets. The base of the shield assembly secures the vertical stabilizer tip assembly to the closing rib of the interspar assembly with flush-head shear bolts and screws.

## VERTICAL STABILIZER TIP - MAINTENANCE PRACTICES

1. Removal/Installation Vertical Stabilizer Tip (see Figure 201)

A. Equipment Required - None.

B. Remove Vertical Stabilizer Tip.

(1) Open and attach warning tags to circuit breakers as listed in:

(a) Chapter 23, COMMUNICATIONS

(b) Chapter 34, NAVIGATION

WARNING: DO NOT ENERGIZE ANY COMMUNICATIONS SYSTEMS WHILE PERSONNEL ARE WORKING NEAR ANTENNA AREAS ON VERTICAL STABILIZER.

(2) Position two maintenance stands of sufficient height to gain access to top of vertical stabilizer.

NOTE: Steps (3), (4) and (8) applicable to those airplanes equipped with HF antenna.

(3) Remove screws securing HF antenna coupler access door, on left side of vertical stabilizer.

NOTE: Bag and tag all loose parts for ease of reinstallation.

(4) Disconnect HF antenna feed-thru lead from pressure fitting "egg-beater" connector in upper end of antenna coupler compartment.

(5) Remove screws securing tip assembly to closing rib of stabilizer interspar assembly.

(6) Supporting stabilizer tip assembly, remove two countersunk-head bolts from two spar lug locations (four places).

(7) Carefully remove vertical stabilizer tip assembly.

(8) Stow feed-thru lead in base of tip assembly.

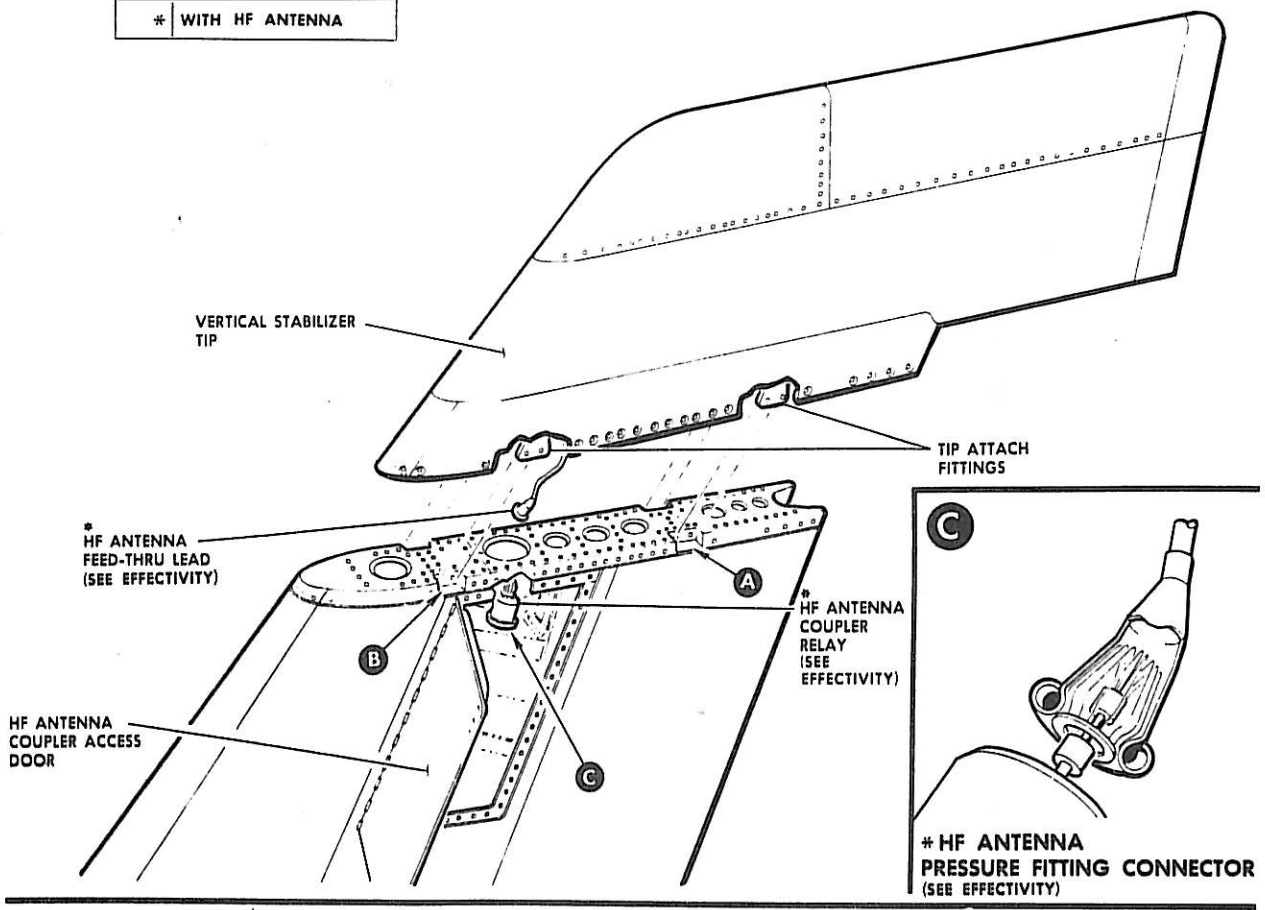
C. Install Vertical Stabilizer Tip.

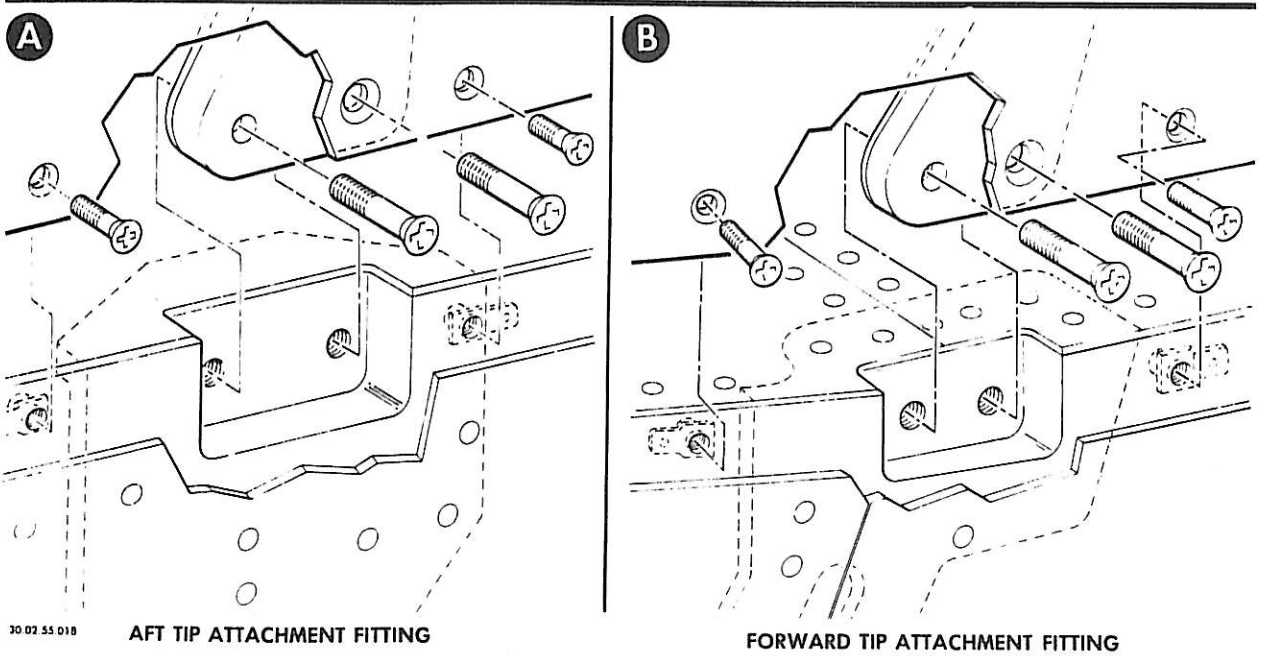
(1) Check that circuit breakers on circuit breaker panels are open, as listed in paragraph B (1).

(2) Place two maintenance stands of sufficient height to gain access to top of vertical stabilizer.

NOTE: Steps (4), (8), (9) and (11) applicable to those airplanes equipped with HF antenna.

| EFFECTIVITY |
| --- |
| APPLICABLE TO AIRPLANES |
| * WITH HF ANTENNA |




AFT TIP ATTACHMENT FITTING

FORWARD TIP ATTACHMENT FITTING

(3) Support stabilizer tip assembly over closing rib of interspar assembly.

(4) Thread antenna feed-thru lead into top of antenna coupler compartment.

(5) Carefully slip stabilizer tip assembly into place and align holes in lower edge with those in closing rib of interspar assembly.

(6) Install two countersunk-head bolts through each spar lug attachment location (four places).

(7) Install flush-head screws securing lower edge of tip assembly to closing rib of interspar assembly.

(8) Connect HF antenna feed-thru lead to pressure fitting "eggbeater" connector in upper end of antenna coupler compartment.

(9) Close HF antenna coupler access door, and secure with flushhead screws.

(10) Close circuit breakers on main circuit breaker panel, as listed in paragraph B (1), and remove warning tags.

(11) Perform HF communications system Adjustment/Test procedure as directed in Chapter 34, NAVIGATION.

(12) Clear maintenance stands from airplane area.

# RUDDER - DESCRIPTION AND OPERATION

## 1. Description

The rudder consists of a main control surface, a flight tab, and a trim tab; see Figure 1. The flight tab is located near the center of the rudder trailing edge and hinges to the rudder at five places. The trim tab is located just below the flight tab and hinges to the rudder at three places. The complete rudder assembly hinges to the vertical stabilizer rear spar at eight locations. For removal and installation of rudder and components, refer to Chapter 27, FLIGHT CONTROL.

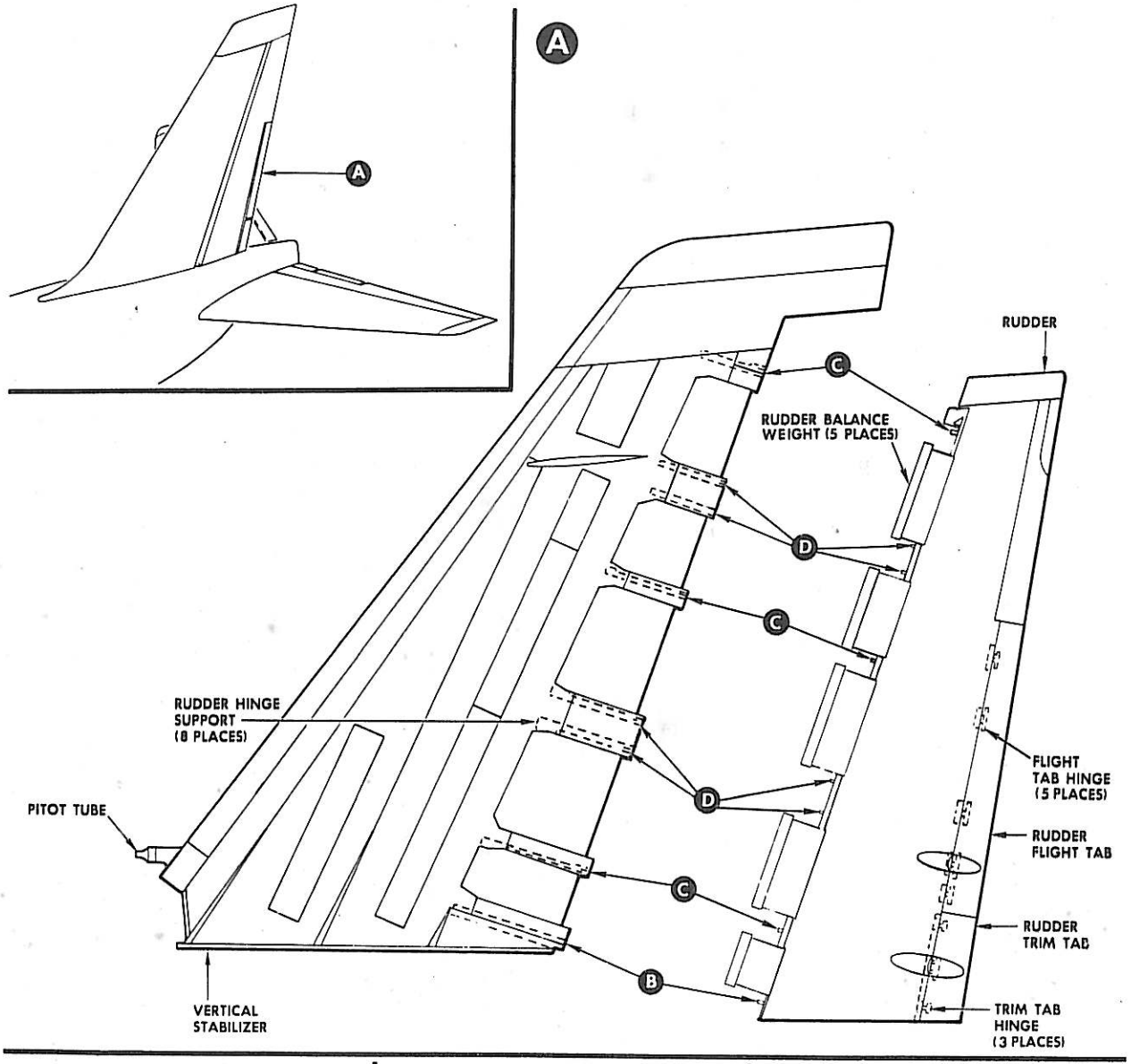
## 2. Structure

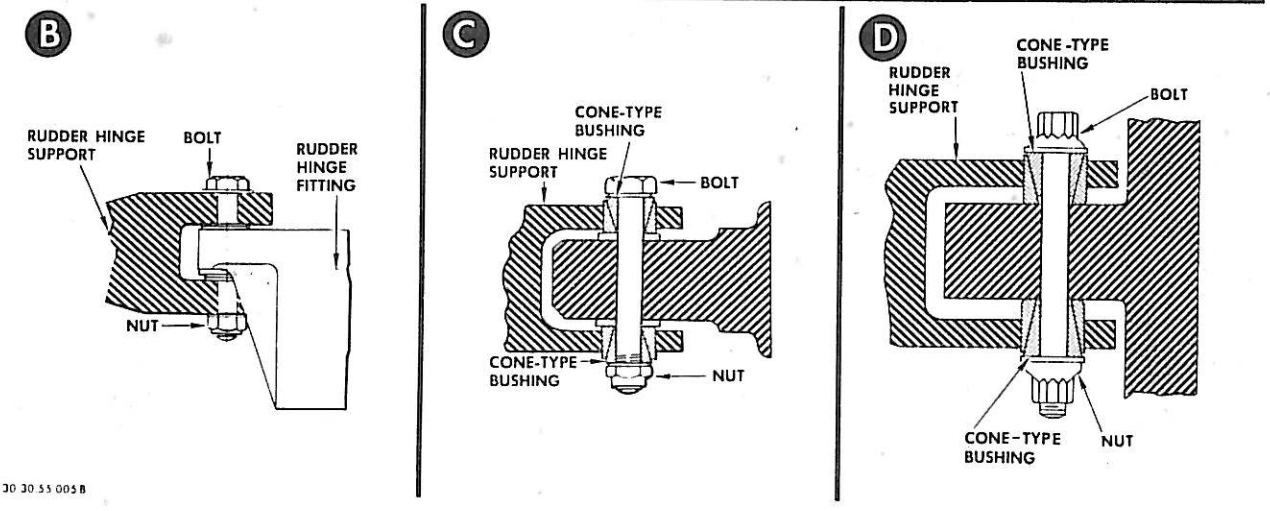
The rudder construction is the single-spar, single-cell type and incorporates nose boxes between the hinge fittings. The rudder skin is 2024 aluminum alloy reinforced with 2024 aluminum alloy formers spaced at approximately four-inch intervals. Web-type ribs transfer the hinge loads into the rudder structure. A 2024 aluminum alloy doubler is bonded to the under surface of the rudder skin in the area over the ribs, formers, and spar rails. In addition, a 2024 aluminum alloy doubler is added along the spar rails and extends aft over the hinge ribs to aid in transmitting hinge loads into the rudder torque box. The rudder tip has a fiberglas skin covering with a fiberglas honeycomb core.

The rudder main spar is of conventional built-up construction with extruded 2024 aluminum alloy rails and web. A closing spar of 2024 aluminum alloy is added near the trailing edge to provide a mounting surface for the flight and trim tab hinges. The rudder trailing edge closing strip above the flight tab is of honeycomb sandwich construction.

The rudder nose box assembly extends forward from the main spar and between the rudder hinge locations. This box assembly is fabricated from 2024 aluminum alloy skin stiffened by 2024 aluminum alloy hydropressed ribs.

The flight tab and trim tab are of aluminum honeycomb, sandwich-type construction with 2024 aluminum alloy skins and 5052 honeycomb core. The 2024 aluminum alloy channels serve as spars. A doubler is added along each spar and aft in the region of the hinge fittings.


A
A
RUDDER
C
RUDDER BALANCE WEIGHT (5 PLACES)
D
C
RUDDER HINGE SUPPORT (8 PLACES)
D
FLIGHT TAB HINGE (5 PLACES)
PITOT TUBE
RUDDER FLIGHT TAB
C
RUDDER TRIM TAB
B
VERTICAL STABILIZER
TRIM TAB HINGE (3 PLACES)


B
RUDDER HINGE SUPPORT
BOLT
RUDDER HINGE FITTING
NUT
C
CONE-TYPE BUSHING
RUDDER HINGE SUPPORT
BOLT
CONE-TYPE BUSHING
NUT
D
CONE-TYPE BUSHING
RUDDER HINGE SUPPORT
BOLT
CONE-TYPE BUSHING
NUT

30 30 55 005 B

Figure Detail

(4) Apply a thin parting agent coat of petrolatum on lugs and inside socket surfaces of vertical stabilizer attach fittings at fuselage station 1439. — A

(5) Make certain all loose wires and cables are secured clear of vertical stabilizer attaching area.

(6) Reinstall interspar access doors in vertical stabilizer as instructed in Chapter 12, SERVICING.

CAUTION: DO NOT LIFT VERTICAL STABILIZER UNLESS ALL INTERSPAR ACCESS DOORS ARE INSTALLED AND SECURED WITH ALL FASTENERS.

(7) Lift vertical stabilizer and position over fuselage as shown in Figure 401.

(8) Carefully lower vertical stabilizer until bolt holes in lugs align with bolt holes in sockets of attach fittings on fuselage.

CAUTION: MAINTAIN SUFFICIENT CLEARANCE BETWEEN VERTICAL STABILIZER LEADING EDGE AND DORSAL FIN STRUCTURES AT FUSELAGE STATION 1439 UNTIL ATTACH FITTINGS ARE ALIGNED.

(9) Install a large bolt at each main attach fitting of vertical stabilizer (six places) as follows:

(a) Install washer, MS20002C20, on bolt, Convair 22-14801, with countersunk area under bolt head (2 places). — A

(b) Insert bolt, Convair 22-14801, through holes in attach fittings at fuselage station 1439 with bolt head facing either forward or aft (2 places).

(c) Install washer, MS20002-20, on threaded end of bolt, Convair 22-14801, (2 places).

(d) Install washer Convair Q8-H4028-8, on bolt, Convair 22-14801, over washer, MS20002-20 (2 places).

(e) Install nut, 32FT1614, on bolt, Convair 22-14801 (2 places).

(f) Install washer, MS20002C24, on bolt, Convair 22-14800, with countersunk area under bolt head (4 places). — B

Figure Detail

(g) Insert bolt, Convair 22-14800, through holes in attach fittings at fuselage stations 1488 and 1526 with bolt head facing forward (4 places).

(h) Install washer, MS20002-24, on bolt, Convair 22-14800, at rear of attach fittings (4 places).

(i) Install washer, Q8-H4028-8, on bolt, Convair 22-14800, and over washer, MS20002-24 (4 places).

(j) Install nut, 32FT1614, on bolt, Convair 22-14800 (4 places).

(k) Using a torque wrench and a 1 7/16-inch crowsfoot, torque nuts 35 to 50 foot-pounds.

(10) Gain access through panel in lower section of shroud at fuselage station 1545 to connect link as follows (see Figure 403).

(a) Install washer, MS20002C29, on bolt, EWB22-9-22 or equivalent, with countersunk area under bolt head. C

(b) Insert bolt, EWB22-9-22, through holes of link and fitting on vertical stabilizer structure with bolt head facing right side.

(c) Install washer, MS20002-9, on bolt, EWB22-9-22, aft left side of link.

(d) Install one or two washers, AN960-916, as required, on bolt, EWB22-9-22, over washer, MS-20002-9.

(e) Install nut, EWN22-9, or equivalent, EWB22-9-22.

(f) Using a torque wrench and 3/4-inch socket, torque nut 1000 to 1300 inch-pounds.

(11) Remove interspar access doors from vertical stabilizer. (Bag and tag screws for installation.)

(12) Fill void around lugs in sockets of attach fittings at fuselage station 1439 with EC1291 sealant (see Figure 403). A

NOTE: Sealant must be injected in attach fittings at fuselage station 1439 before drag angles are installed.

(13) Install drag angles as follows (see Figure 404).